

PROGRESSIVE  
MEDICINE







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1920

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# PROGRESSIVE MEDICINE

A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES  
AND IMPROVEMENTS

IN THE  
MEDICAL AND SURGICAL SCIENCES

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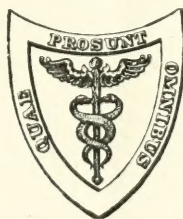
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VOLUME III. SEPTEMBER, 1920

DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART, LUNGS AND  
BLOODVESSELS—DERMATOLOGY AND SYPHILIS—OBSTETRICS—  
DISEASES OF THE NERVOUS SYSTEM



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# PROGRESSIVE MEDICINE.

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## DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART, LUNGS AND BLOODVESSELS.

By O. H. PERRY PEPPER, M.D.

### DISEASES OF THE HEART AND BLOODVESSELS.

"On Cardinal Principles in Cardiological Practice." This is the title under which Thomas Lewis<sup>1</sup> presents his views concerning the essentials in the routine diagnosis, prognosis and treatment of chronic maladies of the heart. In this short article, filling but four and a half pages of the journal, is contained more of practical value to the physician for the routine handling of unselected heart patients than is to be found in most of the sum of the remaining literature on cardiac disease appearing in 1919. The reviewer wishes he might transcribe the entire article; no abstract can do it justice.

Lewis writes: "The day has long gone during which any general student of medicine could keep pace with contemporary writings. He is now faced with an extraordinary medley of statements, simple, simply abstruse or technically abstruse, of which it is no longer possible for any one individual to test or judge the accuracy. We know that some vital facts have come to light; we suspect or know that a considerable proportion of the claims set forth will not be justified by time."

"To judge the true from the false, the large from the small, tries the faculties of those who select and pursue a limited sphere of study; it is impossible to those who have no intimate knowledge of the subjects discussed."

"Time for tests and for reflection is shortened or is gone; the mind is confused by an ever increasing flood of new ideas and suggestions. In this maelstrom general principles have striven to survive; some have succeeded, some have been raised to undue prominence, others have sunk from sight; in the raging of troubled waters all have been, and still are, in peril. There arrives a time when an attempt must be made to sift from the wreckage—a time when it is expedient to assess values."

<sup>1</sup> British Medical Journal, 1919, ii, 621.



Of the principles which have been raised too high, the one which stands most prominent is the constant attempt to differentiate between organic and functional cardiac conditions and to give prognostic importance to the differentiation. "It never has been shown, nor will be shown, that all instances of structural change in the heart are serious; it never has been shown, nor will be shown, that affections in which the heart is suspect but which are accompanied by no evidence of structural disease, are of trivial import. Yet such are the almost universal and instant assumptions as the affirmative or negative answer is given." On the one hand one sees a patient with a "scar on the pericardium or on the edge of the mitral valve, a healed scar which never had, and never will, cause him inconvenience, providing no medical man discovers in him the signs of it and misinterprets its significance." "The other side of the picture shows men who are genuinely distressed when they exert themselves in any way, but who, presenting no cardiac signs other than those of a supposed "functional" condition, are dealt with casually or cavalierly."

Lewis next discusses the question of disease of the valves, protesting against the common statement and belief that there are four common diseases of the valves; "aortic incompetence," "aortic stenosis," "mitral incompetence," and "mitral stenosis." To these names, as such, Lewis makes no objection; the objection is to the manner in which they are used. They do not refer to diseases at all but are merely descriptions of the events at two of the valvular orifices of the heart. They are dependant, if you will, on disease or imperfection of these valves. "The terms are regarded individually as sufficiently descriptive of many a patient's case; actually each is wholly insufficient from this point of view; *a fortiori*, the term mitral incompetence is insufficient." The statement that a patient suffers from mitral incompetence does not tell you whether the patient is engaged in his everyday occupation or whether he lies moribund; whether his prospect in life is good or is bad; whether he requires treatment or not. Such a classification of heart disease is the result of the grossly exaggerated importance attributed to the valvular element by perhaps the majority of medical men today.

So marked is the emphasis on valvular affections that many come to regard the presence of two such conditions as constituting a double disease. "The terms 'double aortic,' 'double mitral' are sufficiently commonplace to bear witness to this tendency. Nevertheless, there is in these patients but one lesion of the valves." Lewis knows no evidence that a patient with both aortic stenosis and aortic regurgitation is in a more serious case than is he who presents regurgitation alone. The misconception is even greater when the mitral valve is in question. "Often after a diagnosis of stenosis of the mitral valve has been made, the doctor's expression grows ominous as he detects a systolic bruit." The detection of the second murmur adds nothing whatsoever to the seriousness of the prognosis; in fact there are good grounds for the view that mitral stenosis is always accompanied by regurgitation. "Detect mitral stenosis and you need waste no time inquiring into the question of incompetence; there are far more serious matters to weigh. At the

present time cardiac prognosis, as it is widely practised, is perilously near to counting murmurs and assessing the gravity of the outlook in proportion."

Both for prognostic and therapeutic purposes there are two valvular conditions which it is imperative should be recognized; they are mitral stenosis and aortic incompetence. Fortunately, both these conditions may usually be diagnosed with confidence, for it is their habit to present signs of an unequivocal nature. Far more important than the recognition of the valvular defect, is the fact that the diagnosis of valvular disease carries conviction of an inflammatory or degenerative lesion of the heart. The valve lesion tells us something of extra burdens which the heart must bear, but when these valvular lesions exist it is safe, with but few exceptions, to assume that the muscle of the ventricles is in greater or lesser degree faulty. Especially does this statement apply to aortic disease. Lewis goes on to state "It is my confident belief that, had systolic murmurs and modifications of the heart sounds never been discovered, the practice of the profession would have stood on a much higher plane today than it actually does." "These cardiac signs are hints to us, useful guides to possible local mischief; that is their proper status in an examination, but it is not the status which they have."

"Prognosis in cardiac affections, as it is generally practised today, is pitifully inaccurate; because that fact is generally recognized it is equally diffident; what is not understood is that far greater accuracy is easily within reach." The remedy, as Lewis sees it, is for the profession to fasten on to certain cardinal points; to take these cardinal points as a basis of everyday work and for the moment to discard what remains; "to work with those instruments which are always at hand and familiar; to become expert in the use of simple means, rather than indifferent manipulators or puzzled worshippers of instruments wholly or partially beyond general comprehension; to start from an assured basis and to build from that slowly and steadily."

After these introductory remarks Lewis proceeds to what he holds to be the cardinal points in the daily examination of chronic affections of the heart. These deserve to be quoted in full.

1. THE SYMPTOMS AND SIGNS OF CARDIAC AFFECTIONS. These are subdivided into two categories:

(a) *The Early Evidences of an Impaired Circulation.* These are constituted by the symptoms which produce distress on exercise, and the three chief are fatigue leading up to exhaustion, breathlessness and pain. In all patients, whether they are the subjects of actual or supposed cardiac disease, to know the tolerance of physical work is more than half the battle in arriving at a correct estimate of the case. A knowledge of the body's reaction to exercise in health, in ill health, and in the chief forms of heart disease is paramount. I do not mean the rise and fall of pulse-rate or of blood-pressure; they are of service; but those who measure the reaction in this way almost completely fail to appreciate the essential, which is to know the amount of work which must be undertaken to bring forth distress. This method is of such importance that I shall emphasize it by the following considered statements.



No man is competent to manage affections of the heart who has not a thorough grasp of this method, a method which is within the easy reach of every medical practitioner. He may have an exhaustive knowledge of electrocardiography, polygraphy, blood-pressure, percussion, the stethoscope, and what not; as a practitioner he is better without that knowledge if the first knowledge is lacking.

Standing by itself, the method is of more consequence than the remaining cardinal points which I shall name. That is so because no patient who has a normal exercise tolerance has grave heart disease, and because the gravity of the disease in a series of real heart cases is proportioned to the degree of distress produced by a given amount of work more nearly than it is to any other observable phenomenon within our knowledge.

(b) *The Signs of Cardiac Failure of the Congestive Type.* These require no description beyond the statement that I refer to cyanosis and to engorgement as observed in the veins of the neck and in the liver. The exercise tolerance is never normal or near normal when these signs are present; they are late signs. When signs of failure appear the disease is in an advanced state.

2. THE SIGNS OF CARDIAC ENLARGEMENT AND ITS DEGREE, WITHOUT ATTEMPT TO DIFFERENTIATE DILATATION AND HYPERTROPHY. Time will not permit me to expand on this subject. I would say only that, in respect of these, palpation ranks before inspection and percussion, and that the chief sign is the position and extent of the maximal thrust and the structures it involves.

3. SIGNS OF VALVULAR DISEASE. Cardinally these comprise (a) signs of aortic regurgitation, which are obtained reliably as often at the pulse as at the base of the heart, and (b) signs of mitral stenosis, of which but two are valuable, namely, a diastolic thrill in the apical region and a diastolic rumble of low pitch, audible over the maximal thrust, and best heard, often only heard, in the recumbent posture after the action of the heart has been accelerated by exercise.

4. THE PRESENCE OR ABSENCE OF FIBRILLATION OF THE AURICLES. If the heart is beating irregularly, it should be ascertained whether fibrillation of the auricle is present or not. To obtain the last knowledge, a few simple tests nearly always suffice.

(a) If there is constant quickening of the pulse during deep inspiration, fibrillation is not present.

(b) If the heart beats at a rate 120 or over, or can be induced by any means to beat at such rates, while the pulse remains irregular, fibrillation is almost certainly present.

These tests are not exhaustive, but they are sufficiently so for general practical purposes. The remaining disorders of cardiac rhythm, either on account of their comparative rarity or because their significance in treatment is far smaller, cannot be regarded as cardinal.

5. INFECTION. No examination of the patient is complete until the presence or absence of infection has been fully considered. The chief signs are:

(a) *Pallor*, especially when accompanied by sallowness or duskiness of the facies. This sign is of particular value in cases of aortic disease. Pallor in these cases is of ill omen.

(b) *Palpable enlargement of the spleen*, which is not a reliable sign of engorgement of the viscera, but is usually a sign of active infection of the valves in cardiac cases.

(c) The presence of small *petechial hemorrhages in the conjunctivæ, buccal mucous membranes*, or in the *skin* around the base of the neck and shoulders. They are far more frequent than has been suspected until recently, and should be searched for repeatedly in all sallow cardiac patients.

(d) *Clubbing of fingers*, which when slight, is, so I am inclined to think, more frequently accompanied by infective endocarditis than by venous engorgement.

(e) The presence of *fever*, constantly or only from time to time.

(f) *A pulse-rate* constantly over 90 or 100 while the patient rests and the pulse is regular.

(g) *Gradual, but steady, loss of weight*.

Signs (a) to (e) are more especially signs of infective endocarditis, a condition which in its subacute and chronic forms is much more widespread than is commonly believed, and terminates the lives of a goodly percentage of all cases presenting aortic regurgitation or mitral stenosis; signs (f) and (g) are also yielded by intoxications.

6. WHEN EVIDENCE OF DISEASE IS FOUND, ITS ETIOLOGY IS TO BE TAKEN INTO CONSIDERATION. It may be of rheumatic, syphilitic, or other infective origin, or it may result from senile changes. The etiology will control prognosis and treatment in no inconsiderable measure.

"Briefly, the first three cardinal points are those which command consideration first; the last three assume cardinal importance in cases in which, on the basis of one or more of the first three points, disabling heart disease is already diagnosed."

Under the subject of exercise tolerance, Lewis formulates the following everyday rules:

"(a) Where there is definite enlargement, or aortic disease, or mitral stenosis, or fibrillation of the auricles, then the safe course for doctor and patient is to attribute any undue distress on exercise to a cardiac lesion.

(b) In young subjects, if there is no such immediate evidence of heart disease as I have named in the last paragraph, then a deficient exercise tolerance should rarely, if ever, be ascribed primarily to the heart. To this class belong almost all patients who are supposed to be suffering from "heart strain," and a large number of patients incipiently infected with tuberculosis or chronically infected by pyogenic organisms.

(c) In elderly subjects, if there is no sign of structural disease, but a poor tolerance of exercise, the heart cannot be declared free of disease; on the contrary, the heart should be regarded as the probable seat of mischief. It is of course to this class that many cases of grave angina pectoris belong; but it also comprises many myocardial cases, in which the chief symptom is not pain but breathlessness or undue fatigue."

In closing, Lewis gives some general principles in treatment and emphasizes especially the importance of suitably regulating the physical

strains thrown upon the heart. "It is not good practice willingly to allow a cardiac patient to call forth his whole reserve, and consequently to suffer pain, undue breathlessness, or fatigue." But on the other hand, "It is not often good practice to limit the activities because some physical sign other than a sign of distress is discovered." There are three indications which call for the bed treatment of cardiac disease; the first is distress on even slight exertion; the second is that active infection is thought or known to be present; the third that drastic treatment with a drug of the digitalis group is required. If the patient continues to be breathless while in bed, then he is usually very gravely ill, and it is necessary to try with all our means to reduce his exertions by waiting on him hand and foot.

The chief value of digitalis, according to Lewis, lies in its power to control the ventricular rate when fibrillation of the auricles has come. "Those who regard digitalis as a cardiac stimulant mistake its character; its chief action is to rest the heart. To the heart foxglove is not tonic, but powerfully hypnotic. It extends the diastoles of the heart; it extends the period of sleep." Work is good for cardiac cases but only such work as falls well within the bounds of the heart's reserve is beneficial. If possible, the partially disabled worker should be placed and cared for in suitable employment. It is not sufficiently understood that discharge from hospital is read by many as a sanction to return to the old work. Finally, as infection is the chief cause of heart disease, so should active measure be instituted for the treatment or removal of the causative infection. Even more important is it to guard against infection.

White,<sup>2</sup> in writing on the diagnosis of heart disease in young people, quotes from the above article by Lewis and agrees heartily with him. White has noticed, since returning to civil life, a group of cases, particularly in young women, which had been diagnosed as heart disease, sometimes for years, not infrequently as mitral stenosis, and which he now feels were no more heart disease than were the cases of effort syndrome encountered in soldiers during the war. He points out, quite properly, that if these patients have not heart disease—and the evidence is against their having heart disease—reassurance and treatment of their nervousness are the important therapeutic measures. Naturally, much worry has been occasioned and much time has been lost for some of these people as the result of the inaccurate diagnosis in the past. White also reminds us that there are other conditions besides effort syndrome which because of the symptomatology, may simulate heart disease. Hyperthyroidism is perhaps the most important of these but infectious diseases must also be mentioned.

Confirmation of this point of view is supplied by Meredith<sup>3</sup> who among 2000 young women engaged in collegiate, clerical or factory work found 193 who had been told by physicians that they had heart trouble. Usually it was the valves which had been thought to be diseased and advice had been given to work as little as possible. Meredith examined these 193 cases with extreme care and failed to find

<sup>2</sup> *Journal of the American Medical Association*, 1920, lxxiv, 580.

<sup>3</sup> *Boston Medical and Surgical Journal*, 1919, clxxxi, 734.



evidence of anything more than the symptoms and signs usually presented by the cases of effort syndrome. Obviously these individuals were unlikely to improve as long as their attention was riveted upon the heart and their life activities limited. As White says, this mistake in diagnosis is in civil life more probable in young women who, under normal conditions, are more susceptible to nervousness or the so-called effort-syndrome than are young men.

To some, these opinions may seem a little too dogmatic and positive; some will wish to cling to the time-honored diagnosis of mitral regurgitation; some will still emphasize the importance of systolic murmurs at the mitral area. All through the recent literature, however, the tendency to advance along lines similar to those emphasized by Lewis is apparent. Stengel<sup>4</sup> touches the same note but does not go quite so far as Lewis in his opinion concerning the significance, or, rather, the lack of significance, of systolic mitral murmurs. He does, however, emphasize that once the endocardial infection has died out, the valvular lesion is left in a more or less fixed and permanent condition. It remains as it was left by the healed endocarditis and does not in most cases tend to be progressive; for this valvular lesion compensation is established and there is nothing in the existing circumstances which must inevitably tend to eventual cardiac break-down. The valve lesion is an extra burden which the heart must bear as Lewis says, and Stengel points out the importance, for the preservation of compensation, of sparing the already burdened heart as far as possible. As he puts it: "The reserve power which protects the normal heart against the well-nigh unavoidable strains of daily life is lacking to a very considerable extent in cases of valvular disease, which, therefore, more readily yield to such recurring strains. Unusual safeguards must, therefore, be provided for the individual having a cardiac lesion." Further reference to Stengel's views on the treatment of valvular heart disease before failure of compensation has developed will be made under the heading of treatment.

**Cardiac Diagnosis.** In contrast to the general principles referred to above, let us now turn our attention to a brief consideration of certain specific questions of diagnosis.

Benjamin and Brooks<sup>5</sup> suggest two diagnostic methods. The first is said to be useful in the differentiation of persistent and simple tachycardia; the individual undergoing examination is instructed to drop the head and to bend forward to an angle of about 45 degrees, whereupon, if the case is one of simple tachycardia, the rapid heart very quickly will retard to a remarkable degree, sometimes to half of the original rate. The second method praised by these observers was originally described by Morison, and consists in the inhalation of amyl nitrite as an aid in the diagnosis of presystolic murmurs. Under the influence of this drug, a doubtful presystolic murmur is intensified sufficiently to be readily diagnosed in those cases where true mitral stenosis was present; in other cases the suggestive presystolic sounds were eliminated.

<sup>4</sup> Medical Clinics of North America, March, 1920, iii, 1331.

<sup>5</sup> Journal of the American Medical Association, 1919, lxxii, 707.

**STUDY OF THE HEART SOUNDS.** The importance of studying the heart sounds rather than the murmurs is a corollary of the views above stated.

Crummer,<sup>6</sup> in discussing the significance of the first sounds of the heart, points out that a study of the first sounds is helpful in determining the significance to be attached to systolic murmurs under suspicion as diagnostic criteria. In the fourth or fifth interspace, just to the left of the sternum, the right first sound is heard most clearly; the first sound originating in the left ventricle is best heard just above and within the apex-heart. In the normal heart the first sound right and left are practically the same in length and quality of tone, but the right not quite so loud. The first sound on the right is almost always normal or but slightly changed so that this sound may be used as a standard and the left first sound compared with it. Changes in the left first sound are common; it is increased and booming in aortic insufficiency and absent in a very large proportion of the cases of pure mitral insufficiency. In fact, Crummer states "It is perfectly safe to make a diagnosis of organic regurgitation, upon this combination of no first sound at the apex and a loud systolic murmur, with normal first sound right. Likewise, it is impossible to substantiate a diagnosis of mitral insufficiency when there is systolic murmur and a normal first sound left." Changes in the first sound left, other than an increase or absence, lead to other conclusions; shortening of the sound even without a systolic murmur, is suggestive of myocardial weakness and in such instances a systolic murmur can frequently be elicited by exercises with an accompanying disappearance of the first sound. The button-hole mitral stenosis gives the most typical snappy first sound; the valve element dominates this sound exactly as the muscle element dominates in the booming first sound. In Graves' disease with rapid heart-rate, the first sound, both right and left, is shortened and has a rather peculiar stroke, "which allows one to differentiate it clearly from an equally rapid systole, due to other conditions." Behavior of the first sound in the various forms of cardiac irregularity presents many interesting features, but they are a little too detailed for this review. In closing, Crummer emphasizes that the object of his article is to suggest that the normal standard of the right first sound be substituted instead of "an illy-defined memory picture of the first sound of the heart."

Wiggers,<sup>7</sup> from an experimental study of the heart sounds, comes to the following conclusion: "When reserve and caution are exercised, a change in the intensity of the first sound over any area is good evidence of a change in tension developed during systole of the ventricles, while a change in the intensity of the second sound over the aortic and pulmonary areas may safely be used as an index of a change of pressure at the beginning of diastole in the greater and lesser circuits, respectively." In other words, the intensity of the first sound is not related to the volume of blood discharged by the ventricles but rather to the systolic

<sup>6</sup> American Journal of the Medical Sciences, 1920, clix, 20.

<sup>7</sup> Archives of Internal Medicine, 1919, xxiv, 471.

tension developed within the ventricles. Clinically, this is of interest and reminds us of the well-known, but often-forgotten, fact that loud sounds do not always mean an efficient heart.

*Cardiopleural Succussion Sign.* Duboff<sup>8</sup> has described an interesting observation. The patient, a man, aged twenty-one years, was suffering from unilateral left-sided tuberculosis. In the course of his disease a pyopneumothorax developed. Interest was directed to the unusual physical sign by the patient complaining of a constant noise in his chest which seemed worse at night and prevented sleep. On physical examination the right lung was found clear while on the left the signs of the pyothorax were easily demonstrable. The heart was displaced to the right; the heart sounds were regular and clear. With each systole a distinct short splash could be heard over the entire precordium. This sound could also be heard easily without a stethoscope by placing the ear before the patient's open mouth, and it was this sound that the patient was conscious of.

The explanation of the sound was apparent upon fluoroscopic examination; the fluid at the left base was disturbed with each heart-beat sufficiently to produce an audible splash, just as in hydropneumothorax when the patient's body is shaken. In hydropneumopericardium a similar state of affairs exists and a splashing sound synchronous with the heart-beat may be heard. In the present instance no hydropneumopericardium could be demonstrated in the fluoroscope and Duboff explains the sound as having been due to the agitation of the pleural fluid by the pull of the heart in systole upon a pericardial pleural adhesion. Some years ago the reviewer reported an instance of an audible sound produced by an overactive and enlarged heart striking against a dilated stomach. Under those conditions a sound was produced, synchronous with each systole, which could be heard all over the patient's room and differed but little from the sound obtained upon percussing over the upper gastric area. Both of these observations are reasonable and in fact James, in 1904, in his study of the reported cases of hydropneumopericardium suggested that it was conceivable that the systolic splashing sound supposed to be characteristic of the presence of both air and fluid in the pericardium might occur in hydropneumothorax although he was able to cite no case.

*Notes on Heart Murmurs.* Esmein<sup>9</sup> presents some evidence to favor the value of compression of the eyeball as a help in the study of heart murmurs. By this method accidental or functional murmurs weaken or disappear while true organic murmurs become more distinct. He opposes the British teaching that every diastolic murmur is of importance and that no systolic murmur is to be considered seriously.

Pardee<sup>10</sup> has attempted to determine the best conditions for the hearing of the murmurs of mitral stenosis and of aortic regurgitation. It is known to all of us that the patient's position plays an important part in the eliciting of signs in the lungs and heart, but it is valuable to

<sup>8</sup> Journal of the American Medical Association, 1919, lxxiii, 1752.

<sup>9</sup> Paris Médicale, 1919, ix, 9.

<sup>10</sup> American Journal of the Medical Sciences, 1919, clviii, 319.



know in exactly what position our chances are best of hearing a faint murmur in these two conditions in which the recognition of the murmurs is so important for diagnosis.

The murmur of mitral stenosis is best heard after exercise, and especially when lying on the left side after exercise. Without exercise the left lateral and the bent forward positions are by far the most favorable. The dorsal and the erect positions are less favorable, but all should be employed in a doubtful case. "In fact in any one position, and especially in the erect position, some cases may show nothing at all to suggest mitral stenosis, yet in the more favorable positions a typical combination of murmurs may develop."

The best conditions observed for hearing the diastolic aortic murmur were the erect, bent forward position, the erect position in forced expiration and the erect position after exercise. Pardee feels very strongly that these different positions are of real help not only in the early diagnosis of a case, but in the careful study of the progress of a lesion over long periods of time.

Another method of examination in part dependent upon changes in position is described by Dausset.<sup>11</sup> He claims that in certain individuals one can demonstrate an increase in the heart area when the subject reclines. This increase is due to a spreading out of the heart in those in whom the cardiac musculature is poor in tone; in some only one part of the heart spreads out and this Dausset suggests may prove of value diagnostically.

Milroy<sup>12</sup> emphasizes very strongly the value of auscultatory percussion in outlining the heart.

**Congenital Deformities and Diseases of the Heart.**—From Brittany comes a report which suggests that congenital diseases of the heart, like congenital diseases of the nervous system, may be unusually frequent in that district. Lenoble<sup>13</sup> has seen 13 cases of congenital heart disease in three years and his present article concerns the details of 5 of them. In none of the patients had there been any symptoms which might be referable to the cardiovascular system, but in all the resistance was lowered and 2 of the 5 had tuberculosis. Their ages ranged from thirty-three to fifty-four years. One cannot help being amazed at finding that two of this group of adults supposedly suffering from congenital heart disease were diagnosed by Lenoble as having the lesion of mitral stenosis.

Plowden<sup>14</sup> reports a congenital deformity of the heart of unusual nature. There was an interventricular opening one-half inch in diameter and this with the tricuspid orifice were the only openings into the right ventricle. No pulmonary artery leading away from the heart could be found and the author is inclined to the belief that an abnormally placed vessel coming off from the under surface of the transverse arch of the aorta represented a futile attempt at the formation of a pulmonary artery. Such a report is of little clinical interest, whereas

<sup>11</sup> Jour. de Radiologie et d'Elect., 1919, iii, 385.

<sup>12</sup> Medical Record, 1919, xcvi, 581.

<sup>13</sup> Ann. de Méd., 1919, vi, 185.

<sup>14</sup> South Carolina Medical Association Journal, 1919, xv, 649.

the case reported by Gandy,<sup>15</sup> although very rare, has a practical application. The patient first developed cardiac symptoms at the age of nineteen years after a violent blow in the precordial region. Examination nine years later resulted in a diagnosis of coincident incompetence of the pulmonary valves and stenosis of the mitral valve. Gandy in spite of the history, believes the lesions to have been congenital.

There have been many arguments *pro* and *con* concerning the possibility of the development of endocarditis, following trauma. Experimental work would seem to favor the occurrence of valvular lesions after external violence to the precordial region. Capello<sup>16</sup> reports an instance of this condition: A previously healthy man, aged twenty-one years, was kicked in the chest and not long afterward developed the signs of aortic and mitral insufficiency. The endocardial process was obviously infectious and there were multiple emboli; death took place thirteen months after the injury. It is supposed that the blow brings about small hemorrhagic areas upon the valves and that these form points of lessened resistance to the attack of any organisms which may be at hand.

DEXTROCARDIA is always of interest. Vaquez and Donzelot<sup>17</sup> report 2 cases of what is called "dextroversion." By this is meant that although the long axis of the heart points to the right yet there is no inversion of the cardiac chambers. In such individuals the electrocardiographic curves are normal in contradistinction to true cases of dextrocardia in which the electrocardiographic record usually shows definite abnormalities of which the most striking is the complete inversion of Lead 1. Willius<sup>18</sup> details 3 cases of true congenital dextrocardia; in all, the abnormal position of the heart was associated with a transposition of the stomach and colon. Sometimes it is the heart alone which is displaced, but the more frequent condition is that of situs transversus, both heart and abdominal organs being involved.

Acquired dextrocardia is of no less importance and in fact from many aspects it is of far more, for while congenital dextrocardia seldom, if ever, gives symptoms or suggests any attempt at treatment, the acquired form resulting from the mechanical displacement of the heart by some intrathoracic pathology, is almost always associated with distinct symptomatology and is often an indication for active treatment. Vogt<sup>19</sup> has reported such a case. A man, aged twenty-six years of age was found to have a marked dextrocardia due to an enormous left-sided empyema which had been present for two and a half years. Nine and a half liters of pus were removed in the course of three days resulting in a gradual return of the heart to its normal position.

False dextrocardia may be brought about not only by displacement due to pressure of a left-sided effusion or pneumothorax, but also by

<sup>15</sup> Bull. et mém. Soc. méd. d. hôp. de Paris, 1919, xliii, 691.

<sup>16</sup> Gazz. d. osp., 1919, xl, 601.

<sup>17</sup> Presse Méd., 1920, xxviii, 41.

<sup>18</sup> American Journal of the Medical Sciences, 1919, clvii, 485.

<sup>19</sup> Med. Klin., 1919, xv, 517.

traction upon the heart due to pathology in the right chest. Such a case is reported by Guarini<sup>20</sup> in which an apparent dextrocardia resulted from sclerosis of the lung with retraction of the whole mediastinum.

Parsons-Smith<sup>21</sup> reports 4 cases of true dextrocardia, 2 of which were associated with transposition of the liver and stomach, while in the other 2 the heart was transposed but the liver and stomach occupied their usual positions. It is his opinion that in the former cases in which there is a transposition of more than the heart alone, there is no resultant cardiac disability and the condition is usually diagnosed by accident. On the other hand, dextrocardia without transposition of viscera is of serious moment. This statement applies not to those cases of false dextrocardia in which the dextrocardia is of importance chiefly because of the pathology which brought it about, but to true cases of congenital dextrocardia not associated with transposition of the liver and stomach.

Parsons-Smith concludes that symptoms of incompetence are bound in such cases to appear sooner or later as a result of the general visceral overcrowding, the liver impeding the movements of the heart and the upper lobes of the right lung. Patients with this anomaly are apt to complain of pains, both local and referred, the result of pressure upon the intercostal nerves, the brachial plexus, the vagus or its intracardiac endings. And later these patients tend to develop dyspnea, palpitation, insomnia and faintness. Frequently there is present also some malformation of the heart or great vessels, such as pulmonary stenosis, incomplete septa, or patent ductus arteriosus. If this be the case it would seem that some of the symptoms, if not all, should be blamed on the malformation of the heart rather than on the simple dextrocardia.

Abnormally small hearts have been studied by Secher<sup>22</sup> who emphasizes the lessened resistance of those individuals whose hearts belong in this group. Laubry and Bordet,<sup>23</sup> under the title "The Triangular Heart," claim that whenever dilatation of the right ventricle occurs the roentgenographic outline of the heart becomes triangular. All persons exhibiting this shaped heart outline must be classed as suspicious, if not positive, cardiac cases.

It is possible that congenitally small hearts are of importance in the determination of later cardiac failure; possibly the basis for the hereditary tendency to cardiac disease which has been described rests in this anomaly to some extent. Galli,<sup>24</sup> in writing of the inherited tendency to cardiovascular disease, observed in certain families, states that in many such instances the heart and the aorta are smaller than the average and the blood-pressure lower. If this is true, it makes the recognition of small hearts of importance, especially in children in whom by hygiene and progressive exercises the hypoplastic organs may be protected and their efficiency increased.

In attempting to find some method of expressing the size of the heart

<sup>20</sup> *Rif. Méd.*, 1919, xxxv, 438.

<sup>22</sup> *Hospitalstidende*, 1919, lxii, 1119.

<sup>21</sup> *Políclinico*, 1920, xxvii, 65; *Abs. Journal of the American Medical Association*, 1920, lxxiv, 922.

<sup>23</sup> *Lancet*, 1919, ii, 1076.

<sup>24</sup> *Presse Méd.*, 1919, xxvii, 633.



many schemes have been suggested. The ideal method would convey the size of the heart in relation to the individual and also in relationship to hypertrophy and dilatation. Danzer<sup>25</sup> reviews this problem: Percussion is at best difficult and some authorities deny that moderate enlargement of the heart can be demonstrated by the use of percussion alone even by the most expert. The position of the apex-beat is considered only moderately reliable. Instrumental methods, for example, the electrocardiogram, the orthodiagram and the roentgen-ray plate taken with the tube at six feet or more from the patient, all have their objections if only that a more or less elaborate instrument and technic are required. Danzer believes that for practical purposes the ratio between the size of the heart and chest is quite constant except when pathological processes influence it. Thus, the cardiothoracic ratio will be of great value if properly recorded. A single roentgen-ray plate is taken, the greatest diameter of the thorax measured, and the diameters of the heart to right and left measured at their widest points. The plate should be taken in the upright position and while the breath is being held in mid-inspiration. As a result of 500 or more estimations, it was found that the normal heart is usually less than half the greatest diameter of the thorax. The average was about 45 per cent., and anything over 50 per cent. was regarded as suspicious. If the ratio of heart-diameter to thorax-diameter exceeds 53 per cent., the individual was considered definitely pathological. Danzer concludes that this method is based on the anatomical relationship that exists between the heart and its containing frame, the chest; that the method is within the reach of the majority of practising physicians, and that it is practical and useful in the estimation of cardiac size, particularly in cases of moderate or early enlargement.

**Pathological Curiosities.** TUMORS OF THE HEART are not common and for this reason the following case-reports deserve comment. Norton<sup>26</sup> describes in detail the history and examinations of a patient, a soldier, aged twenty-nine years. The symptoms, physical examination and leukocytosis suggested the provisional diagnosis: acute toxic myocarditis, bronchopneumonia. Later there appeared some mental disturbances which were definite enough to lead to a diagnosis of dementia precox by a psychiatrist. At autopsy the heart was found enlarged, weighing 510 grams. The left auricle was filled by a tumor mass which was implanted by a broad base on the auricular wall. The mass was irregular and there were projecting polypoid-like growths, one of which partially occluded the right pulmonary vein and another partially occluded the mitral orifice. The tumor measured 9.5 cm. by 8.5 cm. and was covered by endocardium. Microscopically, it was diagnosed a true myxoma, which is the commonest form of all primary tumors of the heart. Norton quotes the classification proposed by Link for primary tumors of the heart according to their clinical symptomatology. This is as follows:

Group I. Tumors developed in the auricles. The characteristics

<sup>25</sup> American Journal of the Medical Sciences, 1919, clvii, 513.

<sup>26</sup> Ibid., 689.

of these neoplasms is to produce a very marked stasis in the lesser as well as the greater circulation. During life it may have been impossible to explain this stasis, which did not depend upon any ordinary cause.

Group II. Comprises pedunculated tumors arising in the left auricle filling its cavity and sometimes penetrating through the mitral orifices into the left ventricle. These tumors produce symptoms of stenosis and insufficiency with disturbances of compensation. The signs here on auscultation are very variable and change with the position of the patient.

Group III. This group is composed of tumors having as their principal seat the right ventricle. The symptoms have been about the same as those of angina pectoris, with sudden death.

Group IV. In this group are placed tumors of the left ventricle and tumors of the valves where edema, dyspnea and undoubted signs of aortic insufficiency were present. These patients die a sudden death without having offered any special symptoms during life.

According to Meroz, the only variety of tumors of the heart which can be suspected from the physical examination are the pedunculated intracavitary growths which are apt to produce indistinct and particularly very variable signs of insufficiency or stenosis and which also produce multiple emboli. Their symptomatology is variable, but an exceptional continued intense dyspnea, for which no satisfactory explanation can be given, is the rule. Norton's case would fall either in Group I or II of Link's classification and would be classed by Meroz as a pedunculated intracavitary tumor but without the dyspnea or embolism. Norton agrees with Petit, and others, in emphasizing the variability of symptoms and signs as the most important diagnostic help.

Foree<sup>27</sup> reports 2 cases of primary neoplasm of the cardiac valves. These are much more rare than are primary tumors of the heart walls; in fact, Forel can only refer to 10 cases other than his own. Six were myxomata and 4 were fibromata. In the cases which he records, the neoplastic process in one instance was fibroma and in the other an endothelioma. His conclusion is as follows: "To sum up, it can be said that the general primary neoplasms of the cardiac valves exist; that they are very uncommon, small, and usually of no import so far as clinical symptoms are concerned; that they are indifferently situated on all the cardiac valves, they may or may not be vascularized; and, lastly, that up to date three types have been found, viz., fibroma, myxoma and endothelioma."

*Actinomycosis involving the heart* is another rare pathological condition. Letulle and Hufnagel<sup>28</sup> report a case in which the entire heart and pericardium were included in the actinomycotic lesions. Apparently the process had taken its origin from the esophagus and spread from there to the heart, right pleura and to the base of the right lung. Here again is an example of the method of spread of actinomycosis which has been referred to in connection with actino-

<sup>27</sup> International Clinics, 1919, iv, 147.

<sup>28</sup> Bull. de l'Acad. de Méd., 1919, lxxxii, 120.

mycosis of the lung. The actinomyces in its spread disregards all anatomical relations and boundaries; it simply extends further and further and destroys all in its course. Only about 23 cases are on record of involvement of the heart and in more than half of these the actinomycotic process was only metastatic in the heart, the result of suppurative metastatic emboli derived from some distant focus. The patient in this instance was a man, aged twenty-four years, who had been ill for almost three years with the symptoms of pleurisy and bronchitis. Progressive edema had appeared two months before admission to the hospital and death took place the day after admission apparently from cardiac failure.

**Affections of the Myocardium.** In discussing the methods of arriving at an estimate of the degree of integrity of the heart muscle, Dana<sup>29</sup> gives the following list of indications of a damaged myocardium in the order of their value:

1. The general appearance of the subject with special reference to his color, to the occurrence of actual dyspnea, or distress, or cough or exhaustion resulting from exercise.

2. The presence of a true gallop rhythm at rest or following exercise.

3. The production, as a result of exercise, of a relative mitral insufficiency, as evidenced by a murmur.

4. The presence, in the absence of valvular disease, of signs of decompensation, as edema of the lungs or of the extremities, whether at rest or after exercise.

5. Weakening of the first sound at the apex, resulting from the effort test.

6. Increased strength of the first over the right ventricle as compared with the first sound at the apex, occurring after exertion.

7. Weakened first sound at the apex, at rest, in the absence of emphysema.

8. The production, following the effort test, of irregular heart action or the increase in irregularity, already present, brought on by exertion.

9. Loss or weakening of the second sound at the apex, due to exercise.

Dana quite properly emphasizes the statement that no one of these criteria is sufficient, but that they must be taken together with additional evidence before a positive diagnosis of diseased myocardium may be ventured. He also reminds us that changes in the systolic blood-pressure, diastolic pressure, or pulse pressure are not to be considered very significant in relation to myocardial weakness.

Nuzum<sup>30</sup> reports some observations on the occurrence of EOSINOPHILS IN THE MYOCARDIUM AFTER DEATH FROM DIPHTHERIA. This he states is the first observation on this subject in American literature, although several reports have appeared in continental journals. The cells he observed were polymorphonuclear in type, with many sharply stained granules. They were so prominent as to be detected easily on glancing over a properly stained section with low power, but there seemed to be no relationship between the eosinophilia found in the myocardium and

<sup>29</sup> American Journal of the Medical Sciences, 1919, clvii, 750.

<sup>30</sup> Journal of the American Medical Association, 1919, lxxiii, 1925.



the severity of the clinical symptoms or to the degree of myocarditis or the amount of serum used in treatment. Several explanations have been advanced for this accumulation of eosinophils; it has been attributed to the administration of antitoxic serum but of this there seems to be little evidence.

It is interesting to note that Nuzum found this so-called "eosinophilous myocarditis" in 7 of 29 cases of diphtheria and that in no instance were the eosinophils found in the structures which make up the specific conducting system of the heart, that is, the sinus node, Tawara's node, the His bundle and the Purkinje fibers. In these parts, however, a moderate degree of cloudy swelling was found, and Nuzum suggests that this may account for some of the arrhythmias observed in diphtheria. The bundle of His is surrounded by a firm connective-tissue sheath and within this structure, therefore, a little swelling might result in an increase of pressure sufficient to inhibit the passage of impulses. It is heart-block which is more frequently seen in diphtheria than extrasystoles or auricular fibrillation.

MYOCARDITIS FROM ILLUMINATING GAS POISONING is reported by Liebmann.<sup>31</sup> The patient, a woman, aged thirty-eight years, was overcome by illuminating gas while in a bath-room despite the window being open. She was found unconscious and taken at once to the hospital where she died twenty hours after admission. The diagnosis could not be doubted both from the fact that the bath-room had been found filled with gas and also the spectroscopic tests of the patient's blood were positive. At autopsy, a severe interstitial and parenchymatous myocarditis was found. This finding Liebmann believes may explain the symptoms sometimes observed in such cases of illuminating gas poisoning. Zondek<sup>32</sup> describes in such cases an initial tachycardia, extrasystolic or severe sinus arrhythmia, a marked drop in blood-pressure and a dilatation of the heart. In his cases, however, these phenomena appeared over a period of some days, while Liebmann's patient died within twenty-four hours after being overcome. It would seem that Liebmann's finding must receive confirmation before being accepted.

An echo of the influenza epidemic comes to us in the article by Minet and Legrand<sup>33</sup> on CARDIAC INFLUENZA. They comment on the small amount of attention which the heart has received in the extensive literature on the complications of influenza. This was not the case in the earlier epidemic, for, in 1890, Huchard coined the name Cardiac Influenza. These observers have seen, during the epidemic of 1918, 6 cases falling under this heading. In at least 3 of these 6 cases there was sufficient evidence of myocardial damage to justify the diagnosis of myocarditis. Cure took place in all three. Not only the myocardium is vulnerable to damage in influenza; endocarditis and pericarditis are also seen; and, in addition, the well-known bradycardia and tachycardia of influenza. Prognostically, these authors are pessimistic,

<sup>31</sup> Deutsch. med. Wehnschr., 1919, xlv, 1192.

<sup>32</sup> Ibid., 678.

<sup>33</sup> Paris Méd., 1920, x, 133.

especially in those cases in which there occurs an organic lesion of the heart.

Another cause of MYOCARDIAL WEAKNESS and BRADYCARDIA is described by Lorand.<sup>34</sup> During the period of food shortage in Vienna, a number of young individuals were observed with a pulse of 56 to 60 beats per minute, while another group of working people suffered from attacks simulating angina pectoris. In neither group were there any other evidences of organic disease of the heart. No cause could be discovered for these phenomena, and Lorand was led to attribute the bradycardia and the anginal attacks to the inadequate and abnormal diet. He points out that vitamins were lacking; more important perhaps was the low content of the diet in calcium, potassium, phosphorus and sugar. All of these are needed by the heart muscle, and the symptoms above mentioned are results of the lack in these substances. It has been reported that the blood of patients with war edema, another result of the unusual dietary, contains a lowered amount of calcium and sugar, a fact which fits in with Lorand's hypothesis. Furthermore, Lorand was able to bring about the disappearance of the bradycardia by supplying a diet containing much sugar, calcium, potassium, phosphorus and vitamins. One can scarcely consider such a condition as a myocarditis and yet, if essential food elements for the heart muscle were lacking over a period of any length, degenerative processes or atrophy would be certain to commence in the myocardium.

**Endocarditis.** An interesting thought is suggested by Lambert<sup>35</sup> in an article entitled "The Incidence of Acute Rheumatic Fever at Bellevue Hospital." He presents figures concerning the incidence of acute rheumatic fever among the admissions to the Bellevue Hospital, and the distribution of these admissions in age groups and by months. These figures seem to show quite clearly a decrease in the frequency of acute rheumatic fever and this decrease is marked after the year 1914. This decrease has affected the year groups from fifteen to twenty-nine years particularly, while there has been but little change in the numbers below the age of fifteen. The interesting question is whether any part of this decreased incidence should be attributed to improved dental care and the removal of diseased tonsils. The coincidence of the decrease in this disease so commonly believed to result from focal infection, and the spread among the medical profession of realization of the dangers of focal infection seems too great to be merely accidental. It was about six years ago that dental clinics were established and that tonsillectomies became very numerous. Both these measures would most affect the groups whose ages fell between fifteen and thirty and it is in this period that the decrease has been most marked. Below the age of fifteen the impression of these preventive measures has not been very noticeable but above thirty there has been some improvement possibly due to dental care. As Lambert says these figures are too limited for any sweeping generalization. "But it would seem that the actual and striking diminution

<sup>34</sup> Med. Klin., 1919, xv, 713.

<sup>35</sup> Journal of the American Medical Association, 1920, lxxiv, 993.

of total admissions for rheumatic fever of the past two years was more than accidental, and that for this the dental hygiene more than any other one factor was responsible."

It is impossible to state what percentage of these cases showed cardiac involvement, but it is safe to put the figure between 30 and 50 per cent. So that if this reduction proves to be actual, and if it continues, there will result a welcome diminution in the numbers of cardiac cases due to the infection producing acute rheumatic fever. Of course, statistics are notoriously uncertain, and war conditions removed a large number of males of the susceptible age groups out of civil life, but the following table taken from Lambert's article seems very convincing.

RELATION OF RHEUMATIC FEVER CASES TO TOTAL ADMISSIONS.

Years.	Total rheumatic fever cases admitted to Bellevue hospital.	Total admissions to Bellevue hospital; all causes.	Percentage of rheumatic fever cases to total admissions.
1906 . . . . .	444	23,660	1.87
1907 . . . . .	706	28,789	2.45
1908 . . . . .	630	29,411	2.4
1909 . . . . .	512	31,652	1.61
1910 . . . . .	599	36,820	1.62
1911 . . . . .	526	33,214	1.58
1912 . . . . .	432	36,113	1.19
1913 . . . . .	489	36,802	1.36
1914 . . . . .	581	37,162	1.56
1915 . . . . .	475	46,241	1.02
1916 . . . . .	394	43,951	0.896
1917 . . . . .	457	44,315	1.03
1918 . . . . .	218	40,980	0.531
1919 . . . . .	190*	37,632	0.521

\* Calculated from average admission for last four months of five previous years, *i. e.*, adding 11 per cent. to admissions for first nine months,  $172 + 18 = 190$ .

**TUBERCULOUS ENDOCARDITIS.** Although we are accustomed to the fact that a variety of organisms may produce infectious endocarditis yet there are some we meet always with surprise. The literature of the past year and a half includes instances of endocardial damage due to the pneumococcus, the *Bacillus influenza*, the meningococcus as well as to the more usual streptococcus. Tuberculous involvement of the heart valves is, however, a far more unusual condition. Nobécourt<sup>36</sup> describes a case in a boy, aged thirteen years, whose past history included a swelling of the left thumb due to tuberculosis of the phalanx, and a spinal caries resulting in marked deformity. There were evidences of tracheobronchial adenopathy. Special interest, however, centered around the heart; the outline to percussion was much increased and the heart was seen to be enlarged by fluoroscopic examination, the right auricle being especially dilated. The right ventricle was also dilated and a loud systolic murmur was present at the apex, well transmitted to the back and axilla. Above the heart, in the fluoroscopic examination, one could see a homogeneous shadow which was diag-



nosed as a combination of mediastinitis and glandular enlargement. On the basis of this case, Nobécourt discusses tuberculous endocarditis. He points out that this boy had had none of the infections usually preceding an endocarditis and that, on the other hand, he was admittedly tuberculous. In the French literature the author was able to find a number of reported cases to support his hypothesis, but he admits their rarity. In some, the appearance of the mitral valve was very similar to that seen in rheumatic endocarditis, but injections of the material produced tuberculosis in guinea-pigs. It is in children and in those with pronounced tuberculosis, often in fact, in those with the miliary form, that this complication is found. In some instances the association of tuberculosis of the pericardium and mediastinal lymph glands makes the tuberculous nature of the endocardial lesion probable. The general consensus of the authors quoted by Nobécourt is that tuberculosis may involve the valvular endocardium but that it produces less severe lesions than does rheumatic infection.

Another instance is reported by Aguilar.<sup>37</sup> The pericardium, aorta and pulmonary veins were involved by the spread of tuberculosis from a pulmonary lesion. A mitral stenosis was present and this Aguilar interprets as being due also to tuberculosis.

In this connection another case report is of interest. Formerly erythema nodosa was thought to be a rheumatic manifestation and due to the infectious agent which brings about acute rheumatic fever. More recently, however, opinion seems to have swung away from the rheumatic etiology and today it is by many believed that erythema nodosa is a manifestation of tuberculosis.

The case reported by De Meuron<sup>38</sup> occurred in an eight-year-old child. A marked attack of erythema nodosa was followed by the development of signs in the heart which were considered sufficient to warrant a diagnosis of acute endocarditis. The evidence presented in the short report is scarcely adequate and one cannot help being a little unwilling to accept the conclusion, especially as a rapid cure is claimed to have ensued. The fever could well have been produced by some tuberculous process and the cardiac signs as described might merely have been secondary to the fever and prostration. The application of the principles of diagnosis presented by Lewis<sup>39</sup> and others would in the cases just described, certainly not lead to the diagnosis of mitral endocarditis.

**STREPTOCOCCUS ENDOCARDITIS.** If Lambert<sup>40</sup> is correct in his suggestion that acute rheumatic fever is becoming less frequent, there may be a reduction in the number of cases of endocarditis which we see, but recent experience seems to suggest that streptococcus endocarditis is on the increase. Perhaps it is only that it is more frequently recognized. And at times it is extremely difficult to diagnose its presence, while at other times the diagnosis is forced upon one by a number of suggestive phenomena outside the heart.

<sup>37</sup> Rev. Esp. d. Med. y Cir., 1919, ii, 359; Abst., Journal of the American Medical Association.

<sup>38</sup> Arch. de Méd. des Enf., 1919, xxii, 428.

<sup>39</sup> Loc. cit.

<sup>40</sup> Loc. cit.

Valée,<sup>41</sup> in reporting a case of malignant endocarditis with multiple infarcts in the spleen resulting in rupture of the spleen and peritonitis, says that the streptococcus shows more seriousness in the clinical symptoms than the staphylococcus which is the organism which he suspects was responsible for the infection in the case he reports. This statement is open to question, for certainly many of the cases of Streptococcus viridans infection of the endocardium are extremely insidious and amazingly symptomless. On the other hand, true staphylococcic endocarditis is apt to give more active symptoms of infection and be more rapidly fatal. The description of the case given by Valée would suggest to the reviewer that it was streptococcic for the very reasons that are advanced by the author to favor a staphylococcic etiology. Unfortunately, no cultures were made. The chief interest in the report lies in the absence of symptoms of the splenic rupture, and the author properly points out that a rupture of a splenic abscess does not lead to the free hemorrhage which follows rupture of splenic tissue as a rule.

Debré<sup>42</sup> emphasizes the long-protracted course of many cases of malignant endocarditis due to the streptococcus. He assumes that the blood-borne infection does not attack the valve leaflet unless some previous damage has rendered the part vulnerable. Here again we meet varying opinions. Debré also points out the many difficulties in diagnosis prior to the appearance of symptoms due to emboli. These may lodge in any organ and may be of very varying size; as a result, the symptoms may be of many kinds. Danzer<sup>43</sup> not long ago published an interesting account of the various syndromes resulting from multiple emboli in chronic bacterial endocarditis. To the alert physician such emboli act as sign posts guiding straight to an endocardial lesion. The petechiæ are, unfortunately, often overlooked, and in still other cases are misinterpreted as purpuric phenomena.

Malignant endocarditis with perforation of both mitral and aortic valves is of rare occurrence. This was the unsuspected necropsy finding in a case reported by Conboy and Kretschmer.<sup>44</sup> The patient, a soldier in the United States Army, was returned overseas one month after the appearance of indefinite lumbar pains, slight cough, some loss of weight and occasional night-sweats. Physical examination revealed a very much enlarged heart, with a systolic murmur at the apex and a diastolic murmur over the aortic area. There was no decompensation. A week after admission the patient very suddenly complained of severe dyspnea; air hunger developed and the pulse became quite rapid. A similar attack recurred on the following day, with evidence of collapse. Death took place a day later. At autopsy, the heart was found enlarged to about two and a half times the normal size; the muscle structure was poor; the mitral and aortic valves were thickened and showed vegetations of a warty character. One of the cusps of the aortic valve showed a perforation which admitted the tip

<sup>41</sup> Canadian Medical Association Journal, 1919, ix, 1064.

<sup>42</sup> Rev. de méd., 1919, xxxvi, 199.

<sup>43</sup> Journal of the American Medical Association, 1919, lxxii, 699.

<sup>44</sup> Ibid., 1920, lxxiv, 154.

of the little finger, and there was a sacculation of one of the mitral cusps with a perforation at the bottom of the sac. Both of these perforations were obviously inflammatory in origin and cultures from the heart's blood and pericardial fluid, as well as from the peripheral blood during life gave pure cultures of *Streptococcus viridans*.

*Streptococcus endocarditis* may appear under other guises than the so-called "rheumatic" form, and its symptomatology may vary with the virulence of the special organism present. A case reported by Dible<sup>45</sup> recently is of interest in this connection. An infant, aged six months, was suffering from crusted impetiginous sores and a discharging ear. There was also some gastro-intestinal disturbance. Improvement seemed to be progressive until a sudden unexplained fever appeared. Death followed seven days of high, irregular fever, with no other demonstrable symptoms. A moderate bilateral bronchopneumonia was found, and the kidneys showed numerous well-marked miliary infarcts. These latter were obviously of recent formation, and, in some, a minute central area of suppuration was present. There was no involvement of the pericardium, but fresh vegetations were found on the posterior cusp of the aortic valve and a similar patch of granulation was present below the valve on the wall of the ventricular septum. The affected aortic cusp was perforated and the septal wall almost so. Examination of the tissues showed the infectious agent to have been the streptococcus.

We cannot be too often reminded that involvement of the aortic valve is frequently due to "rheumatic" or other infections, and that the old belief that aortic valvulitis is always the result of syphilis was very far from correct. Such a case as has just been detailed is good evidence of this. Statistics also bear out the non-syphilitic nature of many cases. For example, Benjamin and Havre<sup>46</sup> report that among 33 cases of aortic insufficiency, not associated with any other demonstrable organic cardiac disease, only 11 per cent. gave positive serological tests for syphilis. On the other hand, undoubted histories of rheumatism were obtained in 57 per cent., and questionable histories of rheumatism and histories of frequent attacks of tonsillitis were noted in an additional 15 per cent. These results show a lower percentage of cases due to syphilis than is usually claimed even by those who emphasize the frequency of non-syphilitic aortic valvulitis.

In fact, there is another form of aortic insufficiency independent of damage to the valve. Functional aortic insufficiency, it is claimed, may exist without valve defect. The so-called "Corrigan syndrome" may be closely simulated by a condition of altered cardiac action and lessened vascular tone. Bret<sup>47</sup> believes it is a not infrequent finding in cases with high blood-pressure. Undoubtedly in hyperthyroidism all the peripheral phenomena seen with true aortic regurgitation may be present to a somewhat less evident degree.

In the diagnosis of aortic insufficiency there is therefore often diffi-

<sup>45</sup> Journal of Pathology and Bacteriology, 1920, xxiii, 196.

<sup>46</sup> Journal of Laboratory and Clinical Medicine, 1919, v, 47.

<sup>47</sup> Arch. des Mal. du Cœur des Vaisseaux et du Sang, 1919, xii, 494.



culty in determining on the one hand whether the vascular phenomena are due to a valvular defect and, on the other, in distinguishing between the signs of mitral stenosis and aortic insufficiency. As Goodman<sup>48</sup> points out, certain cases of mitral stenosis exhibit a diastolic murmur at the base and certain cases of aortic insufficiency exhibit a presystolic murmur at the apex. The basal murmur of mitral stenosis, the so-called Graham-Steell murmur, may closely resemble that of aortic insufficiency and is usually heard high to the left of the sternum where the aortic murmur may also be heard.

The Graham-Steell murmur, however, is a localized murmur and is seldom transmitted beyond its area of production, whereas an aortic murmur is generally transmitted down the sternum. The Flint murmur, which is heard at the apex in aortic regurgitation, is associated with a thumping, thudding first-sound, whereas the true presystolic murmur of a mitral stenosis is followed by the snappy first-sound. In the differential diagnosis between aortic insufficiency and mitral stenosis, Goodman states that the auscultatory findings, excepting the quality of the first sound at the apex, hold a subordinate place. He concludes: "The most important features in favor of the diagnosis of aortic insufficiency (not arranged in the order of importance) are: (1) Displacement of apex-beat; (2) heaving feel of the apex impulse to the palpating hand; (3) hypertrophy of the left ventricle; (4) Vascular signs, *i. e.*, marked pulsation of vessels, Corrigan pulse, capillary pulse, systolic tone in brachial, with arm above the head; (5) blood-pressure increase of pulse-pressure, marked discrepancy between the arm and the leg pressures."

In favor of a mitral stenosis are:

1. Loud snappy first sound at the apex unless marked by an insufficiency of the mitral valves.
2. Absence of apical displacement and of cardiac hypertrophy.
3. Systolic tap or shock to the palpating hand.
4. Absence of vascular signs.
5. Absence of any characteristic blood-pressure phenomena.

Under the title musical diastolic murmurs in aortic insufficiency, Wilson and Jamieson<sup>49</sup> report 3 cases. In all 3 the murmur was sufficiently loud to be audible to the patients themselves and to the unaided ear of the examiner at a distance of from one to five feet from the chest wall. They were decrescendo in type. In one instance the musical murmur filled the entire diastole, but in the other two cases only the first part of the murmur was musical, the latter part being heard as a high-pitched blow.

Such murmurs are comparatively rare. They occur with less intensity at other valve areas but loud musical murmurs are usually diastolic, and are almost always best heard at the base, usually in the aortic areas. The authors remind us that these musical murmurs are thought to be produced in one of three ways: By the rupture of a valve segment, by the perforation of a valve segment, or by a cord-like strand

<sup>48</sup> American Journal of the Medical Sciences, 1919, clvii, 509.

<sup>49</sup> Heart, 1919, vii, 71.

of tissue across the valve orifice. When they occur, the suspicion of a valve rupture is justified, and, if rupture has occurred, it may be safely assumed that the valve leaflet was not healthy, since experiments upon the pressure necessary to rupture healthy valve segments make it seem impossible that healthy valves ever rupture as the result of any accident. Much the same reasoning applies to perforation of a valve which may occur as a congenital defect, or as the result of an ulcerative process, or, more rarely, an aneurism of the valve first forms and subsequently ruptures.

*Endocarditis of the pulmonary valves* is a distinct rarity. Williamson<sup>50</sup> reports an interesting case in a colored man, aged forty-three years, who entered the hospital complaining of cough, dyspnea, weakness and pain in the left chest. These symptoms had developed suddenly five days before admission to the hospital and were severe. His history was apparently unimportant. The day following admission a diagnosis of "influenzal" bronchopneumonia, with some fibrinous pleurisy and probably a small amount of fluid was made on the finding of physical signs in the chest. Nine days later the temperature became almost normal and remained so for two days, and most of the altered physical signs in the chest improved but did not disappear. The patient felt well at this time and begged to be allowed to get up. Fever, however, reappeared and after a few days the patient had a violent chill, the temperature rising to 105.8°. Reëxamination of the patient showed that the signs in the lungs were less marked; the spleen was plainly palpable, and the heart showed an inconstant systolic murmur at the apex and a very distinct reduplication of the second sound at the base, but heard over the pulmonic area. Two blood cultures were taken and remained sterile, examination of the blood for malaria was negative, the leukocyte count was 16,000 with 92 per cent. of polymorphonuclear neutrophils.

Fever, chills and sweats continued for the next week, the temperature ranging from 99° to over 106° F. The patient lost little strength; the blood cultures continued sterile, the leukocyte count rose to 25,000. On physical examination, the only new finding was upon auscultation of the heart; in the second interspace on the left side a very plain diastolic murmur could be heard, long and soft, and occasionally a short systolic blow in the same locality. Three days later the patient went into coma rather suddenly, and died the same day. A diagnosis of malignant endocarditis of either the aortic or pulmonary valves was made and at autopsy this was confirmed by the discovery of a very acute endocarditis, almost entirely of the pulmonary valves. Near the pulmonary valves there was a vegetation of very large size and on the mitral valve there was found a very slight older and recent endocarditis. Besides a small pulmonary infarct there were no other findings of interest. It is unfortunate that no bacteriological evidence could be obtained of the infecting organisms.

Pure insufficiency of pulmonary valves due to syphilis is described

<sup>50</sup> Medical Clinics of North America, 1919, iii, 119.

by Del Campo.<sup>51</sup> A woman, aged twenty-four years, with a positive Wassermann reaction complained of dyspnea, made worse by effort. Physical examination of the heart revealed hypertrophy and dilatation of the right ventricle, and a diastolic murmur heard loudest in the left second intercostal space. Under specific treatment the symptoms improved.

**Pericarditis.** Williamson's<sup>52</sup> experimental study of pericarditis with effusion is by far the most important contribution on the pericardium which has appeared during the past year. The difficulties of correctly diagnosing the presence of pericardial effusion are well known and the postmortem finding of pericardial exudates entirely unsuspected during life is, of course, not infrequent. A well-defined friction rub appropriate in rhythm and situation, makes the diagnosis of pericarditis quite simple, but the question as to the presence or absence of effusion remains unsettled. In the absence of a pericardial rub, the differentiation between a dilated heart and an effusion may be very difficult. Williamson states that he has on several occasions seen men of distinguished ability do a paracentesis cordis instead of a paracentesis pericardii.

Various theories have been held concerning the behavior of the heart in the presence of effusion; it has been claimed that the heart sank in the effusion just as a solid body would in a vessel containing water; others believe that the heart swims in the fluid and is held in this position by the elastic traction of the great vessels. More recently Curschmann has held that there is very little room for the heart either to "sink" or "swim," being restrained by the small amount of space which normally exists between heart and sternum in front and the vertebral column behind. A few attempts have previously been made to study the distribution of fluids injected into the pericardium but without any very satisfactory results. The method employed by Williamson is a distinct improvement and enabled him to obtain accurate and instructive information. Only fresh cadavers were used and the body was placed in a position resembling that most generally used in clinical examination, that is to say, propped on a pillow at an angle of about 15 degrees. Injections of a mixture of gelatin and agar-agar with salt were made with a large syringe and a long trocar thrust obliquely through the central tendon of the diaphragm. The solution employed is perfectly fluid when warm and requires from one-half hour to one hour to harden sufficiently so as not to be influenced by change of position. However, to be on the safe side, the examinations were not made until from twelve to twenty-four hours had elapsed. As the injections were being made, changes in percussion outlines were noted and in each case accurate measurements were taken of the thorax circumference and of the distance between the posterior surface of the sternum and the anterior surface of the vertebral column. At the necropsy, the injected exudate was sufficiently hard so that it could be handled without fear of breaking. In each case, by casting an exact

<sup>51</sup> *Plus Ultra*, 1919, ii, 315; *Abs.*, *Journal of the American Medical Association*.

<sup>52</sup> *Archives of Internal Medicine*, 1920, xxv, 206.



reproduction of the heart, a similar exact reproduction of the exudate, and lastly, a reproduction of the two together were most carefully made. These casts were then photographed. Williamson in this way studied 33 cases which he divides quite arbitrarily into two groups: Those in which 350 c.c. or less was injected, and the second group in which the exudate measured between 350 and 655 c.c. Larger injections were attempted but it was invariably found that there had been a small rupture of the pericardial sac, and that much of the fluid had escaped.

As a result of these experiments, Williamson comes to the following conclusions:

1. In pericardial effusion the fluid accumulates first along the lower margin of the heart and about the apex, particularly on the diaphragmatic surface of the heart. With small effusions, this is the only place in which fluid accumulates with regularity.

2. The result of the accumulation of the fluid in this position is to push down the left lobe of the liver. This was demonstrable in practically every case, and in many cases it was a very conspicuous feature. Special stress should be laid on this as an early diagnostic sign.

3. The second place in which fluid accumulates is over the great vessels at the base. With small effusions it is occasionally present in sufficient amount to be detected by percussion. With medium-sized effusions this layer is generally thick enough to be demonstrable by percussion, and this retrosternal dullness is an important diagnostic sign.

4. With both small and medium-sized exudates we were neither able satisfactorily to demonstrate percussion dullness in the fifth right interspace (Roth), nor could a rounding of the cardiohepatic (Ebstein) angle be made out in a single case.

5. The behavior of the fluid is practically independent of the position of the patient, with effusions of the size represented by the injections.

6. In at least 14 of the 33 cases the anterior surface of the heart, in spite of the exudate, remained, in part, uncovered by the fluid, so that a pericardial friction rub could readily exist. This persistence of the pericardial rub is to be anticipated in cases in which the heart is relatively large, so that it fills out the space between the vertebral column and the sternum.

7. From the standpoint of most readily reaching small amounts of fluid, the most appropriate sites for puncture are either just outside the apex or in the chondroxyphoid angle.

The accompanying illustration is one of twelve in Williamson's article and gives a good idea of the finished casts.

From the view-point of diagnosis, these conclusions offer several very important considerations. In the first place, no confirmation is supplied for two of the signs which have been much relied upon in the past. Many have commented upon their failure to demonstrate a rounding of the cardiohepatic angle in proved cases of pericardial effusion.

The present writer finds himself among this number and obtains

comfort from the experimental observation. Confirmation, however, is presented of the well-known but often-forgotten fact that effusions may accumulate in one part or another of the pericardial sac and not be uniformly spread over the whole surface of the heart. The pushing

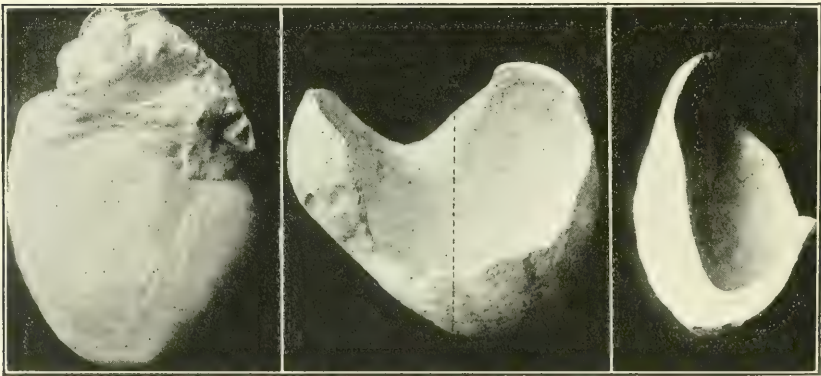
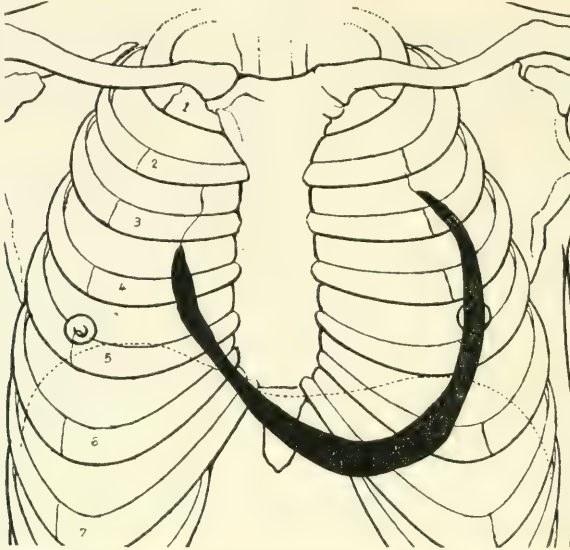


FIG. 1.—Experiment 1; 460 c.c. injected. Weight of heart 530 gm. The fluid is almost entirely confined to the diaphragmatic surface. The front of the heart is uncovered. This figure illustrates well the point that with large hearts the fluid does not collect in front. The left hand photograph is a picture of the cast of the heart itself; the middle photograph is a cast of the corresponding exudate, and the photograph on the right is a section through the exudate on the dotted line. The chest outline shows the relations of the heart and the exudate as seen from the front.

down of the left lobe of the liver by even small, recently formed, effusions is an important observation and, if confirmed *in vivo*, will be a very helpful, early diagnostic sign. That the second place in which fluid accumulates should be over the great vessels at the base is a

little unexpected and difficult to explain unless it be due to the less close approximation of the two layers of the pericardium in that region. Frictions have been known to persist after the development of fluid but the frequency with which the anterior surface of the heart, in spite of the exudate, remained at least in part uncovered by fluid was not to be expected. Furthermore, a most important observation is the one that this failure of the exudate to separate the two layers of the pericardium anteriorly and thus prevent the production of a friction there, is dependent as much upon the size of the heart as it is upon the quantity of the exudate within certain limits.

Therapeutically, there are several lessons to be learned from Williamson's work. As he states, the most appropriate sites for puncture are either just outside the apex or in the chondroxyphoid angle. Certainly it would seem that puncture to the right of the sternum would frequently not be successful. A dry tap, however, in view of these results, would scarcely exclude the possibility of fluid accumulated in some other part of the pericardial sac.

Conclusions from animal experiments, such as those reported by Holmes,<sup>53</sup> are applicable to man to only a limited degree and must be cautiously interpreted. Holmes, however, in his final conclusions, bases them not only upon his experimental results but also upon his extensive roentgenological experience with human cases of pericarditis with effusion. He places first in the order of diagnostic helpfulness an abnormal shaped heart shadow which changes with change of position of the patient. He states that, so far as his observations go, this sign is not present in any other condition. The obliteration of the normal heart outline is also a valuable help, and in this connection he states that the cardio-hepatic angle is more apt to be found obliterated if the patient is examined in the upright position. More difficult to determine but of considerable importance is the change in the shape of the angle formed by the posterior border of the heart, the diaphragm and the spine. Finally, he suggests that faint or absent pulsation is noteworthy. One sees that Holmes's roentgenological findings are in agreement with the experimental results obtained by Williamson.

If such are the difficulties of diagnosis of pericarditis with effusion, how much more difficult must the diagnosis of adhesive pericarditis be? Baumlér,<sup>54</sup> in an article on this subject, details at great length a case in which the correct diagnosis was not reached before death, but he gives little which would help in similar cases.

As a complication of pneumonia, pericarditis varies in frequency in different epidemics but is always more frequent than is generally believed unless autopsies are numerous. For example, Stone,<sup>55</sup> in 300 necropsies on pneumonia patients, presumably all during the winter of 1918-1919, found 72 instances of pericarditis. Thus 24 per cent., or 1 in every 4 cases dying of pneumonia, had some pericardial involvement; in 61.1 per cent. of the 72 instances an acute purulent pericarditis

<sup>53</sup> *American Journal of Roentgenology*, 1920, vii, 7.

<sup>54</sup> *Deutsch. med. Wchnschr.*, 1919, xlv, 705.

<sup>55</sup> *Journal of the American Medical Association*, 1919, lxxiii, 254.



was found; acute serofibrinous pericarditis in 19.4 per cent., and the "shaggy heart" form also in 19.4 per cent. As might be expected, this high incidence of pericarditis as a complication of pneumonia bore a definite relationship to the other complication so commonly seen in the same epidemic. Empyema was the most important factor in the development of pericarditis, and in many instances the pericardial involvement appeared to have resulted by contiguous extension from an empyema. The high incidence of these two complications is probably to be explained upon the type of organism present: In about 75 per cent. of these patients, streptococcus infection was present. Stone states that when effusions of from 300 to 500 c.c. were present, the diagnosis by physical signs and the roentgenograms was fairly simple, but that by neither method could smaller amounts, from 10 to 150 c.c., be diagnosed with certainty. Paracentesis of the pericardium, however, was an important diagnostic procedure.

It is well to remind ourselves that tuberculous pericarditis may occur; Ponce de Léon<sup>56</sup> reports a case in a girl, aged ten years, who while convalescing from typhoid fever, developed what he considers a primary tuberculous pericarditis. Tuberculous pericarditis has also been discussed during the past year by Harsha.<sup>57</sup> A case of recurrent effusion into the pericardial sac probably of tuberculous origin is reported by Roderick and Curl.<sup>58</sup> After repeated aspirations of as much as 1600 c.c. at a time, the fluid reaccumulated less rapidly and the patient was in fair health. No proof of the tuberculous nature of the process could be found, but it was suspected from the lymphocytic cytology of the fluid.

In the treatment of pericardial effusion it must be remembered that there are two distinct indications for aspiration. On the one hand removal of fluid may be indicated in order to reduce infection and the systemic results of absorption from a local infection. This, of course, only applies to such cases of pericardial effusion in which the fluid is distinctly purulent in character. On the other hand, aspiration may be indicated for relief of pressure. This indication paradoxically may be presented by very large and by quite small effusions. In fact W. H. Robey, Jr., has pointed out that it is rather the small or moderate effusion during its formation that produces pressure symptoms. This is due to the failure of the pericardial sac to dilate and accommodate the effusion as rapidly as the fluid is poured out. Before the sac is dilated, a small effusion may compress the great veins and the auricles, and even cause sudden death; especially is this apt to occur if the effusion is developing rapidly. In such cases even a small aspiration may be very beneficial. After the sac has distended, a large effusion may form without any pressure symptoms being produced; but eventually a point will be reached by an enlarging effusion when symptoms due to pressure will make their appearance. In such cases with large

<sup>56</sup> Arch. Lat. Am. de Ped., 1919, xiii, 530; Abst., Journal of the American Medical Association.

<sup>57</sup> International Clinics, 1919, ii, 65.

<sup>58</sup> Lancet, 1919, i, 980.

effusions aspiration of considerable quantities of the fluid is clearly indicated, irrespective of the character of the effusion.

The treatment of acute pericarditis is well outlined by Robey.<sup>59</sup> He commences by emphasizing the importance of prophylaxis. Although pneumonia, tuberculosis, scarlet fever, influenza, typhoid fever, cerebrospinal meningitis, malaria, erysipelas, osteomyelitis, sepsis, gonorrhea, scurvy and leukemia may each cause an acute pericarditis, a far more frequent cause than any of these is "acute rheumatism" or "acute rheumatic fever." In acute arthritis of the very mildest type absolute rest in bed is of vital importance. Bodily rest and warmth, as well as mental quiet, are very important, and should be continued for at least two weeks after all evidences of the infection have disappeared. If, despite our prophylactic efforts, a pericarditis appears then there is even more reason to insist on complete rest and quiet. Exertion should be eliminated; the patient should not be permitted to alter his position in bed without assistance; straining at stool may be avoided by a daily enema or the use of some simple cathartic. Everything should be done to keep the digestion in as good condition as possible; the food should be light and easily assimilable, and should be given in small amounts at frequent intervals. Enough but not too much water should be administered, a small amount at a time. An ice-bag over the precordia often quiets pain, but it must not be too heavy; it is sometimes an added burden to a laboring chest. Early in the forming of an effusion the application of blisters may be very helpful; useful results may be obtained from ten to a dozen leeches applied over the precordia.

Robey strongly advocates the use of sodium salicylate in cases of pericarditis of arthritic origin. The earlier it is given, the better, and in as full doses as possible. Robey suggests 20 grains every two hours combined with 30 or 40 grains of sodium bicarbonate to help prevent vomiting and other symptoms of gastric irritation. He does not fear any depressant action upon the heart. Concerning the action of salicylate in pericarditis with effusion, he gives the following instance: "One of my colleagues was called in consultation to see a case of pericarditis with marked dyspnea and cyanosis. The man was *in extremis*, but because the physician's aspirating set was faulty and the patient being in the country, aspiration was delayed until the following day. The illness had begun one week before with a sore-throat, and, acting on this etiology, the consultant ordered large doses of sodium salicylate, and returning the next day found the patient so much improved that aspiration did not seem necessary."

Codeine or heroin may be used for cough and pain which unrelieved may prevent sleep, and in pericarditis as in all cardiac conditions sleep is very important. Robey does not hesitate to administer chloral in 10-grain dose to be repeated in one-half to three-quarters of an hour, if necessary. Sometimes he combines the chloral with a small dose of morphin and this often succeeds in cases in which morphin alone had previously failed.

<sup>59</sup> Medical Clinics of North America, 1920, iii, 887

The therapeutic value of paracentesis is emphasized by Robey and he further states that if the needle is introduced slowly no harm will result if it touches the heart muscle. He has been able to find only 1 case in the literature where any harm resulted from wounding the heart in this manner; in that case continued hemorrhage into the pericardium followed puncture of the ventricle.

Surgical intervention in affections of the pericardium is becoming more and more commonplace. We now read with little amazement of the stitching up of wounds of the heart or the removal of foreign bodies in or near this organ. For instance, Skirving<sup>60</sup> reports removing a piece of shrapnel casing from the posterior surface of the heart where it has been embedded in adhesions for four months. Ballance<sup>61</sup> believes that surgical drainage of the pericardium is justified on anatomical and pathological considerations and should be performed in certain cases of purulent infection of the pericardial sac. He believes that surgery of the heart will soon occupy a conspicuous place in surgical practice. Operative treatment of adhesive pericarditis is also under discussion. Barbier<sup>62</sup> has reviewed the various opinions concerning this procedure and considers it quite practical although the reformation of adhesions is almost certain. In fact this operation has been cautiously performed with some success. It is interesting to note that Delorme's original article suggesting cardiolysis in pericarditis with adhesions was reviewed by Ewart in the first year of *PROGRESSIVE MEDICINE*, 1899.

**D. A. H. Effort Syndrome. Irritable Heart of Soldiers.** Although the literature on this subject continues to be extensive, much of it adds little to the sum of our knowledge a year ago when it was extensively reviewed in this publication. As might have been anticipated, many physicians are now recognizing this condition in their civil practice as a result of the familiarity with it gained in the army. Let us hope that we shall not allow it to be forgotten again as generally as it was in the peaceful days following the Civil War. The original description by Da Costa was far too important a contribution not have been handed down in medical teaching and literature. The British have been somewhat inclined to belittle the importance of Da Costa's observations, but, as Cohn<sup>63</sup> points out, the symptoms which Da Costa described and which today we recognize are alike. Da Costa believed that the disorder arose most often as a result of infectious diseases, was most likely a functional disorder, going on to organic change in the heart, and was certainly affected beneficially by drugs. Cohn differs from him in believing that no matter what the predisposing cause, whether it be infectious disease, malfunctioning glands of internal secretion or gas poisoning, the disorder is essentially a neurosis, depending on anxiety and fear; that it is removed by the disappearance of the exciting cause and that it is cured by measures designed to influence the neurotic

<sup>60</sup> *Medical Journal of Australia*, 1919, ii, 145.

<sup>61</sup> *Lancet*, 1920, i, 134.

<sup>62</sup> *Progres Médical*, 1919, xxxiv, 409.

<sup>63</sup> *American Journal of the Medical Sciences*, 1919, clviii, 453.



state. Cohn's article is entitled "The Cardiac Phase of the War Neuroses;" it is a broad review of the various aspects of this subject with many references to the recent literature. Unfortunately, it does not lend itself to review and deserves to be read *in extenso*. Another excellent review of this subject is that by Piersol.<sup>64</sup>

Six months ago Cohn estimated that over 250 articles had appeared within the past year or two on this subject; the impossibility of even referring to such a number is obvious. Many investigations have been carried out in attempts to explain certain features of this syndrome and to determine its possible relationship to various other conditions. A few of these will be briefly mentioned.

The breathlessness on exertion which is perhaps the most constant and incapacitating symptom suffered from by patients with Effort Syndrome, or, since we are discussing a British paper, D. A. H. (disordered action of the heart), has been studied by Levine and Wilson<sup>65</sup> from the point of view of the vital capacity of the lungs. It is to be remembered that Peabody, in 1917, established that reduced vital capacity is an important factor in the production of dyspnea in heart disease, but Levine and Wilson have not been able to demonstrate the same relationship in the cases of D. A. H. studied by them.

The same authors with Edgar<sup>66</sup> studied the plasma CO<sub>2</sub> in a similar group of severe cases of D. A. H. and conclude that there is no definite reduction of the alkaline reserve of the blood in cases of this type and that the tendency to breathlessness is not due to the presence of "acidosis."

The superficial resemblance between the symptoms of "irritable heart of soldiers" and those of active pulmonary tuberculosis has led to investigation of a possible relation between the two. King<sup>67</sup> carefully studied 246 men with "irritable heart of soldiers" and found only 1 with definite signs of tuberculosis, the process being in an arrested state. Two men of this group developed active pulmonary tuberculosis after influenza. A smaller group of cases, 32 in number, with the same cardiac diagnosis, were subjected to intensive study and one case of arrested pulmonary tuberculosis was discovered. Undoubtedly, cases of active pulmonary tuberculosis do often present symptoms suggesting the other condition, but after the cases of recognizable tuberculosis have been separated, a large group of cases of "irritable heart of soldiers" remains in which the picture cannot be explained on any tuberculous etiology.

King<sup>68</sup> also studied the question of fatigue in "irritable heart of soldiers." Fatigue is one of the most frequent complaints among patients with this condition and it is of so real a nature to them that, to avoid it, they renounce many pleasures which entail exertion. King employed, for the quantitative estimation of fatigue, the so-called white vasomotor reaction as suggested by Ryan. While this test is local, it is affected by general bodily activity, and is an index to the

<sup>64</sup> Pennsylvania Medical Journal, 1920, xxiii, 258.

<sup>65</sup> Heart, 1919, vii, 53.

<sup>67</sup> Archives of Internal Medicine, 1919, xxiv, 238.

<sup>66</sup> Ibid., 62.

<sup>68</sup> Ibid., xxiii, 527.

subject's sense of general fatigue. The details of the test need not be entered into here; the principal involved is the measurement of the time required for the white line to appear after the skin is firmly stroked with a blunt instrument and the measurement also of the duration of this white vasomotor reaction.

The test requires great constancy in method and the careful control of every variable; even then there is a considerable danger of error. King found that the day curve of fatigue estimations is much the same in the several groups of cases that have the syndrome of irritable heart as in those with organic heart disease. Those patients with irritable heart who fall into the groups of general constitutional inferiority or pure physical inferiority show very rapid fatigue on exercise. This fatigue can be measured, and is an actual phenomenon and not of psychic origin.

Hyperthyroidism often produces a picture closely resembling that named the "Irritable Heart of Soldiers" and much discussion has been carried on concerning the possibility that hyperthyroidism bears an etiological relationship to the latter condition. As Cohn<sup>69</sup> points out, the two conditions have certain similarities and to distinguish one from the other presents genuine difficulties. He goes on to say that, in both, the rate is rapid, the size of the heart often greater than normal, abnormal sounds dependent on the rapid rate and on overaction are likely to be present and a shake or tremor of the extremities is common. There may be diarrhea; there is exophthalmos or the resemblance of it. When one analyzes these apparent similarities, there are discrepancies which appear; the exophthalmos is not genuine but merely due to the look of anxiety; the tremor is more coarse than that seen in true Graves's disease; the rate of the heart is not continuously high, but falls during rest and sleep. Furthermore, the basal metabolism in cases of irritable heart is not raised as one would expect it to be if hyperthyroidism was present. For these reasons, Cohn, while admitting that the two conditions have resemblances, doubts their identity. Lewis and his school strongly oppose the view that the irritable heart of D. A. H., is a symptom of overaction of the thyroid. Others have strongly held this view, among whom are Sir James Barr in England, and Harlow Brooks in this country. Carroll<sup>70</sup> concludes that in both conditions the syndrome develops in individuals in whom there is a hyperirritability of one or other sets of fibers in the autonomic system; and that some types of hyperthyroidism are analogous to the entity neurocirculatory asthenia, and their pathogenesis is probably identical. Hence, constitutional predisposition due to inherited sympathetic or vagotonic instability is a factor, and nervous and emotional strain is the cause, precipitating the syndrome in susceptible individuals.

The remainder of Carroll's conclusions are too hypothetical to be of practical importance.

Under the direction of Peabody at U. S. Army General Hospital No. 9, a number of investigations were undertaken in order to shed light

<sup>69</sup> Loc. cit.

<sup>70</sup> American Journal of the Medical Sciences, 1919, clviii, 35.

upon this question of the part played by the thyroid in the production of the symptom-complex of "irritable heart of soldiers." The negative results obtained in the study of the basal metabolism in these cases have already been mentioned. Reference should also be made to the results of studies on the effects of the injection of epinephrin in soldiers with "irritable heart."

It will be remembered that the reaction to the injection of adrenalin was suggested as a test for hyperthyroidism. Goetsch, whose name has been associated with this test, claims that in clinical states of hyperthyroidism there is an increased constitutional sensitiveness to adrenalin, and in states of hypothyroidism an increased tolerance for adrenalin hypodermically administered. In a positive reaction there is usually an early rise in systolic blood-pressure and a fall in diastolic blood-pressure; there occurs an increase in the pulse-rate and certain characteristic changes in the subjective and objective conditions of the patient; nervousness increases and there may be various subjective complaints. In addition, flushing, coldness and sweating of the hands, and sometimes the development of a tremor of the hands and eyelids are observed.

For obvious reasons, considerable interest is attached to the application of this test with adrenalin to cases of the "irritable heart of soldiers." Incidental to these investigations, a good deal of discredit was thrown upon the value of this test in the determination of the presence or degree of hyperthyroidism. In fact today it is almost definitely proved that little reliance can be placed upon this method of testing for hyperthyroidism.

Wearn and Sturgis<sup>71</sup> studied the reaction to the intramuscular injection of adrenalin (0.5 c.c. of a 1:1000 solution) in normal soldiers and in a group of soldiers showing symptoms of so-called "irritable heart." Not one of the 26 normal soldiers gave a positive reaction as judged by observation of pulse-rate, blood-pressure, objective signs or subjective symptoms. Of the 73 patients with symptoms of "irritable heart," about 60 per cent. gave a reaction which definitely indicated a hypersensitiveness to adrenalin which may be the result of a hyper-sensitive sympathetic autonomic nervous system. A careful clinical analysis of the two groups, those showing a positive and those giving no reaction to the adrenalin injection, revealed no essential clinical differences between the two groups. To further investigate this matter the effects of adrenalin on the basal metabolism in soldiers with "irritable heart," in hyperthyroidism and in normal men were studied by Tompkins, Sturgis and Wearn.<sup>72</sup> They studied four groups of subjects; two were "adrenalin negative" and showed no reaction to injections of this substance; two were "adrenalin positive" and responded to injections with typical reactions of the hypersensitive subject. The "adrenalin negative" groups consisted of normal subjects, the "adrenalin positive" groups of patients with effort syndrome ("irritable heart") and a small series of cases of hyperthyroidism. In

<sup>71</sup> Archives of Internal Medicine, 1919, xxiv, 247.

<sup>72</sup> Ibid., p. 269.



both normal and pathological groups, the metabolism shows a rise after the injection of adrenalin whether there are any other signs of reaction or not; this increase in metabolism, however, is far more marked in those cases with a positive than in those with a negative reaction. Some doubt still exists concerning the exact significance of this increase in metabolism; it may be due to increased muscular tonus, or to hyperglycemia, or perhaps these factors are only partial expressions of a general indirect stimulus to the metabolism from the epinephrin by its action on some system capable of direct metabolic activation.

On the electrocardiograms of patients with "irritable heart" the injection of adrenalin produced pronounced changes in about 60 per cent. of the cases studied by Clough.<sup>73</sup> The abnormalities were various and included: (1) Changes in the P-wave; (2) changes in conduction; (3) changes in the T-wave; (4) effect on ventricular muscle; (5) changes in the heart-rate. It was found impossible, however, to correlate the symptoms complained of by the patients with "irritable heart" at the height of the reaction with the abnormalities of the electrocardiogram. From a clinical view-point the most important changes in the electrocardiographic tracings were those of rhythm; the increase of sinus arrhythmia and the great increase in, or appearance of, ventricular extrasystoles. These are of clinical interest as they might well be observed without the aid of the electrocardiogram.

Boas<sup>74</sup> also studied the relation of neuro-circulatory asthenia ("irritable heart") to hyperthyroidism by the adrenalin test. Although his series was small, his conclusions agree with those of others; it is impossible to predict from any of our present criteria whether or not any particular case of neurocirculatory asthenia will be found sensitive to adrenalin or not. It is noteworthy that only 4 of his 21 patients had palpable thyroids and that only one of these gave a positive reaction to adrenalin.

It can be seen that the adrenalin test for hyperthyroidism is under considerable question. Wearn has seen positive reactions with normal basal metabolism and *vice versa*. Sandiford<sup>75</sup> concludes after extensive experiments that no relationship was found between the intensity of the adrenalin reaction and the degree of hyperthyroidism or hypothyroidism.

A correlated study on cases of "irritable heart" was carried on by Sturgis, Wearn and Tompkins<sup>76</sup> by the use of atropin in place of adrenalin. Their findings, however, were not highly significant.

**Testing the Functional Efficiency of the Heart.** No discussion of this subject is possible without reference to the opinions and writings of Sir James Mackenzie. It is some years since his first publication on this subject but during the past year he has summarized his well-established views in a book entitled *The Future of Medicine*.<sup>77</sup> This

<sup>73</sup> Archives of Internal Medicine, 1919, xxiv, 284.

<sup>74</sup> Ibid., p. 419.

<sup>75</sup> American Journal of Physiology, 1920, li, 407.

<sup>76</sup> American Journal of Medical Sciences, 1919, clviii, 496.

<sup>77</sup> The Future of Medicine, Oxford University Press, 1919.

work is not limited merely to a discussion of tests for cardiac efficiency but is a plea for the simplification of medicine; for the grasping of fundamentals and of simple methods, and for the avoidance of unnecessarily elaborate and complex laboratory procedures. He does not by any means protest against the use of methods which supply knowledge not to be otherwise obtained, but against the pseudo-science of multiplying difficult methods for their own sake rather than for the information and benefit which may result.

As an example of how a simple method may, in well-trained hands, give all the needed information, he quotes the testing of the efficiency of the heart. As he says: "Attempts have been made to acquire the knowledge by experiments on animals and the introduction of every new instrument during the last one hundred years from the introduction of the stethoscope to the latest laboratory contrivance, have each been used to solve the problem." "The failure of these attempts was due to the fact that the only way this object could be achieved was not understood. The recognition of impaired efficiency can be attained only by using those methods that are peculiar to clinical medicine, *i. e.*, the careful differentiation of symptoms with an appreciation of their significance and the watching of individual cases with varying degrees of impairment for a sufficient length of time." Mackenzie closes the chapter from which the above passages are quoted by a brief summary in which he states certain simple deductions:

"The heart's efficiency can be ascertained by recognizing the manner in which it responds to effort.

"The first sign of heart failure is shown by a sensation of distress on the individual undertaking some effort he was accustomed to perform in comfort.

"The chief sensations of distress produced by the exhaustion of the heart are breathlessness or a sense of constriction across the chest or pain.

"By the intelligent interrogation of patients, with a due appreciation and understanding of their sensations, a knowledge of the heart's efficiency in the vast majority of patients can be got in a few minutes, more reliable and instructive than an examination made by a series of specialists employing the most elaborate mechanical means."

By pushing effort to the point of the appearance of some of the symptoms mentioned above or to exhaustion, Mackenzie obtains the data on which he bases his conclusions. Certain points concerning the symptoms produced by effort are worthy of mention. Breathlessness, when it arises from cardiac insufficiency, is always the result of an output of blood insufficient to supply the respiratory center; this statement is sufficiently accurate for our purposes. Effort may induce breathlessness in several ways; even in health there is a limit to the heart's response to effort, that limit being shown by the appearance of distress in breathing. When auricular fibrillation is present, effort usually brings about such an increase of heart-rate that many of the beats are ineffective, and breathlessness is an early and marked symptom after effort. On the other hand, in complete heart-block, effort

causes no increase in the ventricular rate and breathlessness is again an early symptom; the same conditions exist in auricular flutter; for example, the auricles may be beating 300 per minute and the ventricle responding to every second beat, effort will not raise the ventricular rate but breathlessness will appear promptly. As Mackenzie puts it: If, in response to effort, the output of the heart is diminished or not increased, breathlessness is readily induced.

Pain produced by effort is an expression of exhaustion of the heart muscle, and is analogous to the pain experienced whenever any muscle is forced to work with an insufficient supply of blood. Pain presents itself as a variable symptom after effort, variable in degree, extent, etc. True angina pectoris rarely appears in cases of auricular fibrillation although dull pain and aching and hyperalgesia of the left chest wall are not infrequent. Even after effort, cases of auricular fibrillation fail to develop angina pectoris; on the other hand, patients who suffer from angina pectoris, and who were unable to walk far because of the pain, later develop auricular fibrillation and cease to have attacks of pain, being pulled up much sooner because of breathlessness. Other sensations are experienced after effort, the most frequent being exhaustion, but this sensation is not, properly speaking, a cardiac one, but seems to be due to some vagal or vasomotor disturbance inducing a cerebral anemia.

The gist of Mackenzie's views is that affections of the muscle of the heart itself (and no heart ever fails if its muscle is not given more work to do than it can perform without exhaustion) can be judged by the manner in which the heart can maintain an efficient circulation when the body is at rest and when an effort is made. Often the functional efficiency of the heart, or the extent of heart failure can be recognized by the answers of a few questions. Mackenzie states that this conclusion "expresses the results of a profound study of the heart's function and activities, such as perhaps has never been carried on in regard to any other organ, and I dwell upon it somewhat insistently, because it demonstrates how medicine can be rendered simpler in its practice, and more efficient in every respect, whether of diagnosis, prognosis or treatment, when there is an understanding of the laws that govern the symptoms of disease."

It will be seen that in order to employ successfully simple methods, one must be skilled and experienced. This is what might be expected by analogy; in art, the greatest skill is exhibited by the use of simplest technic; on the other hand, skill may make a difficult feat appear absurdly easy. Both elements are present in Mackenzie's success. That we should try and emulate him goes without saying, but let us not be deceived into believing it as easy as it sounds in his description.

The literature on functional tests is filled with references to special forms of test by the originator's name: Katzenstein, Rehfisch, Schrumph, Lian, Mendelsohn, Abrahams, Hertz, Gräupner and many others. The pulse-rate and the blood-pressure have been employed in various ways in an attempt to fix on some formula the development of which after a certain amount of exercise, will be sure to mean an impaired



cardiac efficiency. The persistence of tachycardia after exercise has been claimed to be a helpful sign; a delay in the rise of blood-pressure after exercise has also been advanced as a test of definite diagnostic and prognostic value. To date, no thoroughly satisfactory test has been devised by which the problem can be reduced to a mathematical equation. As Conrad<sup>78</sup> puts it, "But whatever test develops, its diagnostic value will be in the insight it gives us into the heart's ability to maintain the circulation, and its prognostic value in the foresight it gives us of heart failure."

Barach<sup>79</sup> suggests an index which he names the S. D. R. index, based upon the systolic pressure, the diastolic pressure and the pulse-rate. The index is arrived at by adding the systolic and diastolic pressures and multiplying by the pulse-rate per minute; for example, if the systolic pressure is 120, the diastolic pressure 80 and the pulse-rate 80, the S. D. R. index would be 16,000 mm. Hg. pressure per minute; the normal figure is found to be about 20,000 mm. Hg. per minute. The index does not indicate "heart disease" or "decompensation" or physical fitness; it designates, according to Barach, the amount of effort which the circulatory system is putting forth at the time. A high index means increased cardiovascular effort and a low index means either that the circulation is accomplished with little effort or an inability to expend the necessary effort. It is delicate enough to detect minor changes in the circulation, such as are produced by the slightest alteration in the bodily functions, the effect of drugs, etc. In a series of 26,396 men examined the S. D. R. index as a guide to abnormalities in function of the cardiovascular system was correct in 99.95 per cent. a really remarkable figure. In a smaller group of the clinically doubtful cases referred for special cardiovascular examination the S. D. R. index proved a correct guide in 78 per cent.; of the 22 per cent. in which the index failed, more than three-fourths of the cases were tachycardias, and it cannot be said positively that the index was wrong. These conclusions of Barach are suggestive, and the index advised by him has the advantage at least of being readily obtained.

Secher<sup>80</sup> commends the Katzenstein, Rehfish and Schrumpf methods; the first depends upon the difference in pulse and blood-pressure before, and two minutes after, digital compression of the femoral artery for two or two and a half minutes. The Rehfish method is by auscultation before and after bending the knees ten times; Schrumpf's test depends upon the fact that a normal heart will return to its former rate within four minutes after slight exercise, such as bending the knees ten times.

Garcia applied a number of different tests to 20 persons to determine the functional capacity of the heart. By combining several methods he claims to have obtained good results but the findings with Abrahams, Hertz and Gräupner tests were unreliable.

Kahn<sup>81</sup> also carried out comparative functional tests of the circula-

<sup>78</sup> *Journal of the American Medical Journal.*, 1919, lxxiii, 1284.

<sup>79</sup> *Archives of Internal Medicine*, 1919, xxiv, 509.

<sup>80</sup> *Ugeskrift for Laeger*, 1919, lxxxi, 1891; *Abs.*, *Journal of the American Medical Association*.

<sup>81</sup> *American Journal of the Medical Sciences*, 1919, clvii, 634.

tion in 233 individuals between the ages of twenty and thirty. The group included normal individuals, various types of tachycardia, sinus bradycardia, hyperthyroidism, neuro-circulatory asthenia and various forms of heart disease. The exercise used was hopping one hundred times on one foot. In the different conditions quite varying responses were obtained.

As the matter stands today, no one method has demonstrated its superiority, but all methods directed along this line have elements of good in them. Fundamentally, Mackenzie's views are the basis for all of the methods of measuring the cardiac response to effort and there is no special value in any one form of exertion. Some have routinely employed the oculocardiac reflex as one method of testing heart function and vagal tonus but this is in all probability undesirable. Balard<sup>82</sup> states that it is not wholly free from risk. Colic, nausea and collapse have been reported, and Balard records the stoppage of the heart for from fifteen to twenty seconds while the reflex was being investigated.

**Arrhythmias.** Following influenza, disturbances of the heart-rate and rhythm are not at all unusual, being observed most frequently in cases complicated by pneumonia. Cockayne<sup>83</sup> studied a number of such cases in which the evident change was a bradycardia in each instance although not due in each case to the same condition. The bradycardia only became apparent, as a rule, after the temperature had returned to normal; at this time the pulse-rate fell as low as 36 or 48 per minute and this rate might persist for days. Cockayne collected 132 cases in each of which the pulse-rate fell below 50 per minute; he studied 55 cases with polygraphic tracings and found that in 19 the bradycardia was due to partial heart-block. These 19 were some of them instances of sinus block, some of prolongation of the a.-v. interval, and some 2:1 and 3:1 heart-block. No case of complete heart-block was found; all of the partial block cases returned to normal after a few days rest in bed; only one complained of any cardiac symptoms six weeks later.

During the convalescing period of influenzal pneumonia, a tachycardia of 100, or even 120, per minute was not uncommon. Smith<sup>84</sup> studied a series of such cases, 95 in number, to determine whether the influenza had produced some organic disease of the heart, such as myocarditis, or had merely served to bring into the open tachycardias that otherwise might have gone unnoticed. In only one instance was the diagnosis of acute myocarditis justifiable and as far as Smith was able to determine, organic heart disease was not the basis of the tachycardia in these men. Of the 95 men, 36 gave a history strongly suggesting that they had had an irritable heart in civil life and that their recent illness had brought about an aggravation of the symptoms. In 38 men no physical basis could be discovered for the tachycardia, but a majority had, to their knowledge, a rapid pulse in civil life. Twenty men were suspected of hyperthyroidism.

<sup>82</sup> *Gaz. hebdomadaire de médecine et de chirurgie*, 1919, xl, 135.

<sup>83</sup> *Quarterly Journal of Medicine*, 1919, xii, 409.

<sup>84</sup> *Journal of the American Medical Association*, 1919, lxxiii, 1685.

In treating these men, all except the one with acute myocarditis, were given the graded exercises which have been described by Lewis and were assured that they had no cardiac disease. Within a month all but 4 who had the physical findings of chronic inactive tuberculosis, were getting a thirty-minute period of strenuous exercise twice daily and a 3- or 4-mile hike. They felt well, had gained weight and the pulse-rate had decreased in rapidity.

AURICULAR FIBRILLATION is known to develop under a diversity of conditions, and in some instances the fibrillation may not be permanent and a normal rhythm may be restored when the exciting factor is withdrawn, as in pneumonia. A very unusual case, however, is reported by Calandre<sup>85</sup> in which the complete arrhythmia of auricular fibrillation occurred in paroxysms, and only when the patient, who was a morphin addict, was restricted in his use of this drug. As soon as morphin was given him, the arrhythmia would disappear. He was, however, successfully treated for his addiction and after the course of treatment there was no return of the auricular fibrillation.

In this connection it is worth noting that even in cases where auricular fibrillation has persisted for years, it may disappear and the auricles may resume their normal action as a transient event. In the case reported by Lea<sup>86</sup> auricular fibrillation was known to have been present for two years. Electrocardiographic records were made from time to time and, after two years of apparently continuous auricular fibrillation, a tracing unexpectedly showed a resumption of normal auricular activity. This, however, proved to be of short duration and fibrillation again appeared. The patient died within a year.

Kilgore,<sup>87</sup> by an ingenious analysis of simultaneous tracings of the respiratory and pulse curves of cases of auricular fibrillation was able to show that such cases may have superposed upon their apparently absolute arrhythmia periodic tendencies to acceleration and retardation which keep time with respiration. The effect is more marked during slow heart action. He arrived at his conclusions by dividing each respiratory cycle into eight parts. The pulse intervals were then measured in hundredths of a second and divided into eight groups according to the part of a respiratory cycle in which it happened to end; the numbers in each group were then arranged and the averages could then be plotted under a diagrammatic curve representing respiration.

This is one of the cases reported and the following analysis was obtained while the respiration rate was 16 and the pulse-rate 100.

Average of 38 heart intervals ending in 1st division of respiratory cycles 0.605 sec.										
"	43	"	"	"	2d	"	"	"	0.594	"
"	40	"	"	"	3d	"	"	"	0.612	"
"	36	"	"	"	4th	"	"	"	0.610	"
"	43	"	"	"	5th	"	"	"	0.597	"
"	37	"	"	"	6th	"	"	"	0.592	"
"	36	"	"	"	7th	"	"	"	0.592	"
"	39	"	"	"	8th	"	"	"	0.598	"
<hr/>										
312 Total										

<sup>85</sup> Prog. de la Clinica, 1919, vii, 5; Abs., Journal of the American Medical Association.

<sup>86</sup> Heart, 1919, vii, 47.

<sup>87</sup> Ibid., 81.



These averages have a tendency for longer intervals during inspiration and shorter ones during expiration—almost the exact counterpart of other cases similarly analyzed. The patient whose analysis is given above was diagnosed auricular fibrillation without valvular disease. He had not taken digitalis.

Kilgore believes that this phenomenon is best explainable by neurogenic fluctuations in bundle conductivity or in the rate of ventricular recovery of excitability or both.

Along the same line of thought is the claim of Busquet<sup>88</sup> that extrasystoles occur more frequently during expiration owing to the greater interval between normally occurring beats; the slowing of the heart giving a greater chance for ectopic foci to institute extrasystolic contractions.

Auricular flutter is reported on by Caretti,<sup>89</sup> who failed in the case he records to modify this condition by vigorous medication with digitalis and from this fact concludes that the condition will probably merge into heart-block before long. Before accepting this conclusion the facts of the case should be reviewed more carefully.

HEART-BLOCK is attracting attention chiefly through electrocardiographic studies directed at the recognition of the exact point in the conducting paths at which the block is occurring in a given case. To determine the site of the block requires graphic records; the polygraph for this purpose being much less useful than the electrocardiograph. With the electrocardiograph it is possible to differentiate block occurring in the bundle of His, the right or left branch of the bundle, the arborization and the so-called sino-auricular block. Without graphic records it is usually possible to infer the presence of some form of heart-block from a persistent abnormally slow pulse-rate, although there are pitfalls in the diagnosis of most of the arrhythmias unless graphic records are obtained. Even auricular fibrillation, with its total loss of pulse rhythm, may be confused with a condition of numerous irregular extrasystoles; mistakes in each direction are easily made at a single examination, but, on repeated examinations, the true state of affairs is usually evident.

Clinically, it is usually possible to recognize without the aid of graphic records sinus irregularity (respiratory arrhythmia), extrasystolic arrhythmia, paroxysmal tachycardia, auricular flutter, auricular fibrillation, heart-block and sometimes pulsus alternans. On the other hand, there are certain facts which can be gained only by graphic methods, for example, the point of origin of extrasystoles, the auricular rate in auricular flutter and the type of heart-block. As has been said before, however, in many cases, in which for some reason or another, the picture is not clear-cut, unexpected difficulty will be found in determining with certainty the type of disturbance present unless graphic records are made. A very useful brief review of the clinical side of the arrhythmias will be found in an article by Edgecombe.<sup>90</sup>

<sup>88</sup> Arch. des mal. du Cœur, des Vaisseaux et du Sang, 1919, xii, 246.

<sup>89</sup> Prensa Med. Argentina, 1919, vi, 157; Abs., Journal of the American Medical Association.

<sup>90</sup> Practitioner, 1920, civ, 197.

Bard<sup>91</sup> claims that simple inspection of the venous pulse is sufficient in the great majority of cases to permit of distinguishing with sufficient certainty the six clinical varieties that one should recognize of slow pulse-rate of regular rhythm. The six varieties which he mentions are: Total bradycardia, nodal bradycardia, two types of slow pulse-rate due to extrasystoles, and two types of ventricular bradycardia from complete and incomplete heart-block. Undoubtedly, it is true that many of us fail to obtain all the information from the venous pulse that we might, but Bard claims more than most of us can hope to accomplish. It is also true, as Mackenzie has emphasized, that after mechanical methods have taught us what conditions occur in an organ we can then sometimes discard the methods which gave us that information and by simpler methods correctly interpret signs and symptoms which previously were not of use to us because of our lack of definite knowledge. This certainly applies to the arrhythmias and perhaps Bard's claims are not so extravagant as at first they sound.

A clinical study of 20 cases of heart-block is reported by Goodall.<sup>92</sup> The main points which he brings out in the summary are: (1) The relative infrequency of rheumatic or syphilitic history; (2) the almost invariable association of the condition with mitral regurgitation; (3) the tendency to sudden death on gastric distention or exertion; (4) the occurrence of Stokes-Adams "fits" when the heart-block is complete; (5) the frequency of pain as a symptom; (6) the possibility of the condition being transmitted from mother to child; (7) the ability of some patients to work or even to stand severe operations.

Goodall's opening sentence is worth quoting: "From the year 1761 when Morgagni first described "Two Cases of Epilepsy with a Slow Pulse," which were in all probability examples of what was subsequently known as Adams-Stokes disease, interest has always centered around cases of heart-block, which are sufficiently uncommon to be interesting, while sufficiently common to be important."

ARRHYTHMIAS IN CHILDHOOD are of great importance and should always be carefully studied as diagnosis will markedly influence one's prognosis and treatment. Farr<sup>93</sup> has recently reviewed this subject on the basis of his extensive experience with cardiac complications incidental to diphtheria. Simple sinus arrhythmia is of no prognostic significance, while extrasystoles are of uncertain significance but may suggest benign myocarditis with increased irritability. In diphtheria in children the most important cardiac disturbance is heart-block. In all degrees it implies toxic injury or inflammatory infiltration of the conducting fibers and it frequently accounts for the sudden and ominous fall of the pulse-rate in diphtheria. Heart-block should always be suspected if the pulse-rate falls quickly to below 40 per minute, although it may be present with a pulse of 60 or over. On the other hand, a pulse below 60 in children is not always due to block but may be a simple sinus bradycardia. Auricular fibrillation is not a frequent

<sup>91</sup> Arch. d. mal. du Cœur, d. Vaisseaux et du Sang, 1919, xii, 385.

<sup>92</sup> Lancet, 1920, cxcviii, 909.

<sup>93</sup> New York Medical Journal, 1919, cx, 637.

finding in diphtheria, while Farr quotes but one case of auricular flutter following diphtheria; no case of *pulsus alternans* has been reported as occurring in this infection. The reader will remember the reference made above to the probable causation of heart-block in diphtheria in the cloudy swelling of the conducting fibers within the restraining sheath of the bundle of His.

HEART-BLOCK IN CHILDREN is quite rare. Eyster and Middleton<sup>94</sup> were able to find but 20 cases reported in the literature, of which 6 were diagnosed without adequate tracings. In 9 cases the disturbed conduction is ascribed to a congenital defect which appeared as a familial tendency in several instances. In 6 of the 20 reported cases the block developed during severe and usually fatal diphtheria, and, of these 6 cases, 5 terminated fatally. Of the remaining cases, 1 was associated with a severe mitral lesion resulting from acute articular rheumatism; 1 case was ascribed to the presence of a primary cardiac tumor believed to have its origin in the auriculo-ventricular node, and in 1 case the condition was discovered during a severe attack of whooping-cough and bronchitis. In 1 case there was a history of measles four years, and "inflammation of the heart valves" one year, previous to the examination. The remaining case developed during an acute febrile attack of undetermined nature.

The case reported by Eyster and Middleton occurred in a male child, aged two years, and followed an acute nasal and tonsillar infection, on the third day of which the cardiac arrhythmia and murmur were observed. The child was not seen by the authors until six weeks later, at which time electrocardiograms showed increase in the auriculo-ventricular conduction time and blocked auricular beats every third or fourth cycle. The pulse-rate was about 75 per minute and a soft systolic murmur was heard at the apex, transmitted to the midaxillary line.

Four days later, a 2:1 auriculo-ventricular block with a ventricular rate of 62 was present. The roentgenograms showed enlargement of both ventricles and left auricle.

The tonsils were removed as the probable focus of infection and this operation was followed by marked general improvement, and the child has developed normally since and has been apparently in good health. Two years have elapsed and the child still exhibits a 2:1 auriculo-ventricular block with a ventricular rate of between 50 and 60. This block is uninfluenced by full doses of atropin so the depression of conductivity in the bundle is not due to hypervagotonus. The child has a well-compensated mitral lesion which is giving no trouble at present.

The cardiac arrhythmias of childhood are especially concerned with the sinus node in which the normal stimulus for contraction originates. As James has said, children are also slow to develop automatic heart control, just as they are slow in developing control of the temper and bladder. In children, also, the vagus and the sympathetic nerves

<sup>94</sup> American Journal of Diseases of Children, 1920, xix, 131.



are especially active and so exert an important influence on the easily disturbed cardiac pacemaker, the sinus node (sino-auricular node, sino-atrial node). For this reason sinus arrhythmias are common in the young and characterize what Mackenzie has named the "youthful heart." Block due to failure of the sinus node to originate an impulse or to failure of the atrial musculature to respond or to transmit a stimulus is far from common, and the instance of this so-called sino-atrial heart-block in a child reported by Brown<sup>95</sup> is interesting. In 1916, Levine was able to collect but 14 cases from the literature, to which he added 4 of his own. Wilson, 1915, called attention to the fact that up to that time no case of sino-atrial block in childhood had been reported. The case reported by Brown occurred in a boy, aged eleven years, who was suffering with acute arthritis, apparently following an attack of sore-throat. On admission, it was noted that the pulse exhibited occasional "dropped beats" and four days later the electrocardiogram was found to show the sino-atrial block; the tracings showed a complete standstill of the heart for one or more beats, the intermissions being separated by one to six normal cardiac cycles. The exact explanation of this arrhythmia is still in doubt, but, as might be expected, it is found that the arrhythmia is influenced by vagus stimulation and by the administration of atropin. It was found that atropin in small doses will eliminate the arrhythmia without producing an acceleration of the heart-rate.

**Electrocardiographic Records.** It is scarcely desirable that this review should occupy itself to any great degree with the subject of the electrocardiogram and its interpretation. Brief mention of a few articles bearing on this subject may, however, not be amiss.

In the diagnosis of myocardial disease, attempts have been made to correlate certain changes in the electrocardiogram with the disease of the heart muscle. These changes in the electrocardiogram have chiefly concerned that part of the complex which is produced by the ventricular muscle and in the interpretation of these changes it has been assumed that they indicate a faulty conduction of the cardiac impulse through the ventricles. Robinson,<sup>96</sup> in discussing the significance of abnormalities in the form of the electrocardiogram, points out that a consideration of this portion of the electrocardiogram is important as it renders valuable information concerning the state of the myocardium, and has proved of distinct value in determining the diagnosis and prognosis in numerous cases of heart disease. The waves which form the ventricular element of the complex are the Q-R-S waves and the abnormalities which are under discussion consist of a prolongation of the time required to complete this series of waves and a notching of the main, or R, wave of the group.

Willius,<sup>97</sup> in writing of this condition under the title "arborization block," says that it is now generally accepted to indicate disease of the subendocardial myocardium and evidences serious functional cardiac disturbance. He suggests that the electrocardiographic changes are

<sup>95</sup> Archives of Internal Medicine, 1919, xxiv, 458.

<sup>96</sup> Ibid., 422.

<sup>97</sup> Ibid., xxiii, 431.

probably due either to impulse transmission through circuitous and aberrant paths, or to delayed transmission through normal channels. Willius was able to examine 138 patients exhibiting this so-called "arborization block" and found that endocarditis was the frequent causative disorder (35.5 per cent. of the 138 cases). In general, the disorders responsible for the development of this condition were found to be, in order of frequency: (1) Infections; (2) degenerative processes; (3) local nutritional disturbances. In the study of the cases it was noticed that edema was a relatively infrequent symptom and that there was a constant lack of definition and differentiation between the first and second heart sounds. It is undoubtedly a very ominous finding as it entails a large and early mortality (69.6 per cent.), in an average duration of eight and a half months.

Robinson points out that all cases of this type are not necessarily due to definite anatomical lesions involving the intraventricular conducting system and that at autopsy such lesions are not always found. He contends the cases he reports seem to prove that faulty conduction through the ventricles may depend on what has been termed "functional fatigue." In at least 1 case improvement in ventricular conduction followed slowing of the heart-rate. Robinson advances the hypothesis that the disturbance of intraventricular conduction, which in some cases is due to anatomical lesions, may in others be due to the presence of acid metabolites in the ventricular structures as a result of insufficient blood supply, perhaps from coronary sclerosis.

Meakins<sup>98</sup> also states that prolongation of the Q-R-S interval occurs with left-sided hypertrophy, and that prolongation of the whole ventricular systole may occur without definite evidence of localized injury to the bundle of His or its branches.

The notching of the R wave of the ventricular complex was mentioned above as one of the evidences upon which a suspicion of myocarditis may be based. Wedd<sup>99</sup> admits that it is frequently encountered in cases of unquestionable myocarditis but states that it may be present in an otherwise normal electrocardiogram, and is seen in cases in which physical examination affords but little evidence of myocardial disease. It has no quantitative value, but, when permanent, it is believed to indicate pathological changes in the myocardium. Wedd believes that it may be of aid in differentiating purely valvular lesions or functional affections of the heart.

Brugsch and Blumenfeldt<sup>100</sup> have also made observations on the significance of the lengthening of ventricular systole. Their conclusions are not very clear, but they feel that further study will prove the diagnostic value of this method.

Earlier in this article mention was made of the use of the electrocardiogram in estimating the relative preponderance of the two ventricles. Carter and Greene<sup>101</sup> claim that it is, in fact, the only satisfactory clinical method of estimating this feature of the cardiac condi-

<sup>98</sup> Archives of Internal Medicine, 1919, xxiv, 489.

<sup>99</sup> Ibid., xxiii, 515.

<sup>100</sup> Berl. klin. Wchnschr., 1919, lvi, 937.

<sup>101</sup> Archives of Internal Medicine, 1919, xxiv, 638.

tion. It must be remembered, however, that as Lewis has emphasized the electrocardiogram gives evidence not of ventricular hypertrophy of the heart as such, but only of preponderance of one ventricle or the other. Obviously, this is an important distinction. The exact measurements from which the deductions concerning right or left preponderance are drawn are too lengthy and complicated to be given here; furthermore, the exact details are as yet far from established. Carter and Greene express the hope that the determination of the inclination of the electrical axis of the heart may prove to have a value as a quantitative guide to cardiac change, and that the combination of the electrocardiogram with the teleroentgenogram (plates taken with the tube at a distance of six feet or so from the body) will furnish the clinician with an increased insight into the question of the mechanics of cardiac response in cases of hypertrophy.

For the most of us electrocardiography holds many mysteries, and this impression is not made any less by such articles as that by Fahr,<sup>102</sup> whose title is "An Analysis of the Spread of the Excitation Wave in the Human Ventricle." Apparently, it is possible to follow the spread of the excitation process throughout the ventricles along the His-Tawara-Purkinje system, and to measure approximately the rate of progress along this system and in the ordinary muscle fibers. It is even claimed by Fahr that the form of the electrocardiogram in hearts which have a left-sided enlargement is due to the increased length of the conducting path. When one considers the apparently trifling increase in length of the pathway along which the excitation wave must pass, which can occur in any case, the marvelous delicacy of this instrument of precision becomes very evident.

Another condition in which assistance in diagnosis is given the clinician by the electrocardiograph is DEXTROCARDIA. Here due to the altered position of the heart, the records obtained from the usual leads or derivations differ from the normal and conclusions as to the type of dextrocardia may be drawn from these variations. Willius<sup>103</sup> has reported 3 cases of congenital dextrocardia with electrocardiographic findings which confirm previous observations. In Lead I there is a complete inversion of all the deflections, and in one case this inversion also involved Lead II due to an even greater exaggeration of the cardiac axis to the right. This inversion in Lead I is definite evidence of congenital dextrocardia, as in displacement of the heart to the right by pressure or traction there never occurs a complete reversal of the relation of the cardiac tissue to the direction of the Lead.

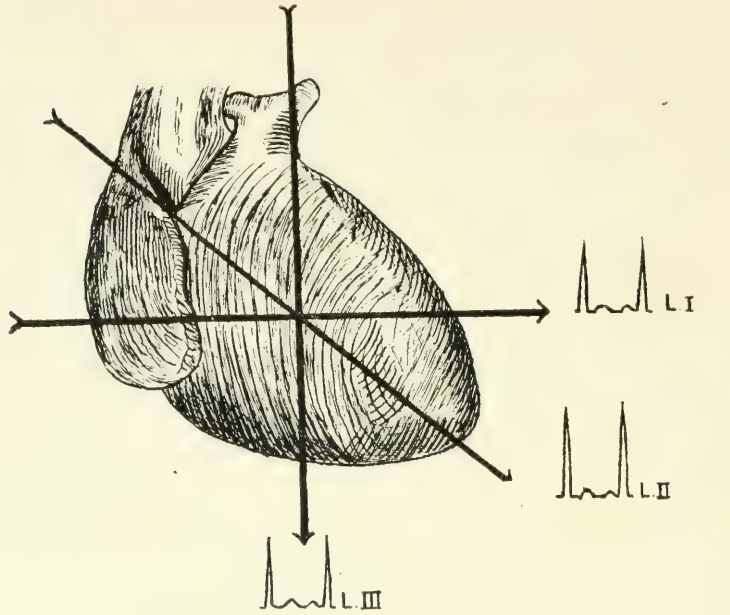
The following illustration from this article by Willius clearly shows the relations of the three Leads to the normal heart and to the heart in congenital dextrocardia.

**Treatment.** The value of digitalis in the treatment of heart affections is undoubted, but it is undeniably true that to obtain good results the digitalis employed must be active, and must be skilfully administered. Too little attention is given by many of us to the finding out

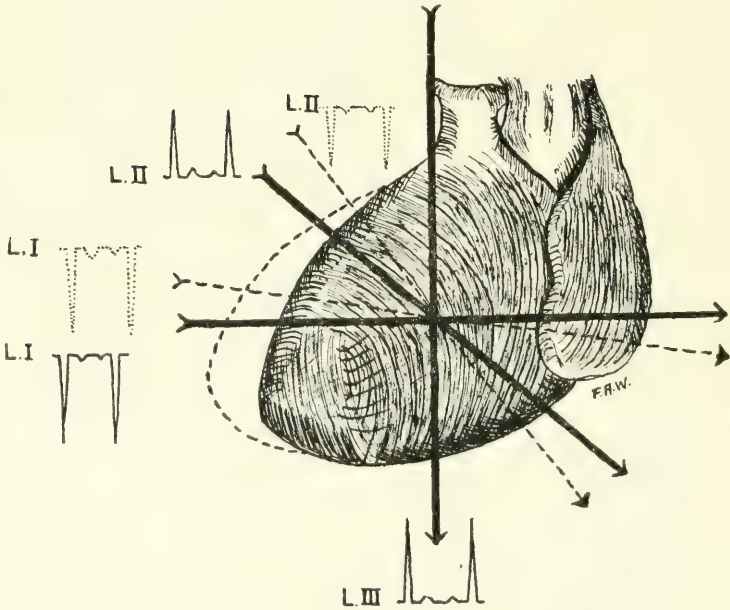
<sup>102</sup> Archives of Internal Medicine, 1920, xxv, 146.

<sup>103</sup> American Journal of the Medical Sciences, 1919, clvii, 485.





A  
Normal heart.



B  
Congenital dextrocardia.

FIG. 2.—Schematic representations, showing the angles produced by the direction of the leads and the resulting electrocardiograms. The dotted lines in Fig. B show the inclination to the right exaggerated and the inversion affecting Lead II.

whether the digitalis preparation which our patients are receiving is capable of bringing about the results for which we have prescribed it. For this reason articles such as that by Pratt and Morrison<sup>104</sup> on the ACTIVITY OF AMERICAN DIGITALIS are especially welcome. As early as 1868, tests of American-grown digitalis gave evidence that it possessed a degree of activity higher than the English or German leaves of that day. No one, however, followed this work up and for many years the American digitalis leaf was little used; before the World War the greater part of the digitalis used in this country came from Germany and Austria, and in lesser amounts from England. Apparently, there was little or no good reason why this should be the case; in fact there is evidence advanced by Pratt and Morrison that some of the high values in activity of Continental digitalis as compared to our lower figures are to be explained on the greater susceptibility of the frog (*Rana temporaria*) used by the European investigators, than the common American grass frog (*Rana pipiens*) which was used in this country. This would result in a larger amount of the leaf being required to produce systolic standstill from which the conclusion might be drawn that the digitalis leaf was less active. It may interest some to be reminded that the *Pharmacopœia* requires that digitalis leaf should be of such strength that 0.006 c.c. of a tincture prepared from it per gram frog weight will produce systolic standstill of the heart in one hour. This is a high standard, and Pratt and Morrison suggest that clinical investigations in the future may show that it is unnecessarily high. In fact, most of the digitalis imported from Germany and England, as well as most of the digitalis grown in the United States, is below this pharmacopœial standard. No less than seventeen of the twenty-five samples of American digitalis which Pratt and Morrison tested were below the standard set by the *Pharmacopœia*; the average strength of the American digitalis, however, was greater than that of the imported digitalis which they examined. They conclude that the best American digitalis, both wild and cultivated, is equal in activity to the best European digitalis, but that all digitalis should be tested biologically before it is gathered in large quantities for therapeutic use. Specimens of high potency were obtained from digitalis grown in Virginia, Nebraska, Wisconsin, Minnesota, Oregon and Washington, but it is interesting to note that there may be considerable variation in the active content of successive crops from the same area. Variation in strength may also be due to other factors such as the method employed in the drying of the leaf.

Even after a potent leaf has been obtained and properly converted into an infusion or tincture the danger of failure is not over. If allowed to remain on the druggist's shelf too long, deterioration may occur and a bottle labelled with an excellent biological assay may contain a preparation almost wholly inactive from age. Zueblin<sup>105</sup> recently discussed this subject and makes the startling suggestion that there seems to be a possibility of imparting new life to dead pharmaceutical

<sup>104</sup> Journal of the American Medical Association, 1919, lxxiii, 1606.

<sup>105</sup> Medical Record, 1920, xcvii, 16.

preparations by a short exposure to the passage of electric waves; in this way the life period of drugs can be much extended.

Far more important are the observations reported by Levy and Cullen<sup>106</sup> concerning the DETERIORATION OF CRYSTALLINE STROPHANTHIN IN AQUEOUS SOLUTION. They observed that different samples of commercial preparations of crystalline strophanthin in aqueous solution in ampules varied very widely in potency by biological assay. Upon investigation, it was found that the sterilized solutions were alkaline in reaction as a result of the use of ordinary soft glass in the ampules. Freshly prepared aqueous solutions of the drug are neutral or faintly acid, but upon sterilization by heat the glass supplied enough alkali to the solution to change it to an alkaline reaction which renders the strophanthin inert. These few examples are sufficient to bring home to us the importance of determining that the drugs we administer are potent, for no amount of skill will avail if the drugs are not.

THE METHOD OF ADMINISTERING DIGITALIS with the best results is still a much discussed matter. Christian<sup>107</sup> believes that most physicians are prone to give too small doses of digitalis, and hesitate to push the drug to the limit of tolerance which he claims should be done unless a definite effect is produced sooner. He would not limit the usefulness of digitalis to auricular fibrillation, although it is in this condition that its most brilliant results are seen; he has seen just as good results in chronic cases of heart disease with edema, but with no irregularity of the pulse except perhaps an occasional extrasystole.

On the other hand, Krehl<sup>108</sup> advises strongly against the thoughtless administration of digitalis. He does not give it unless there is a clear indication and he is unable to improve the symptoms by rest and control of fluid intake and diet. If, however, these measures fail then digitalis is administered promptly and freely. It would seem that there might be considerable argument as to what constitutes and what does not constitute a clear indication. Apparently Christian and Krehl would differ on this point, with the majority of writers supporting Christian's views of this subject.

Gordinier<sup>109</sup> includes angina pectoris among the indications for the employment of digitalis, and this irrespective to the exact stage of myocardial disease present. The drug should be given over long periods and continued in small doses for a tonic effect.

That there is a disadvantage in a too wide belief in the value of digitalis is also emphasized by Hart.<sup>110</sup> He points out that in the pneumonia of the recent epidemic there was no evidence that death occurred from cardiac insufficiency and the postmortem examinations offered no proof that the heart had been essentially damaged. During the pneumonia, digitalis acted on the heart in the same manner as in a similar series of hearts without complicating pneumonias. Only

<sup>106</sup> Journal of Experimental Medicine, 1920, xxxi, 267.

<sup>107</sup> American Journal of Medical Sciences, 1919, clvii, 593.

<sup>108</sup> Deutsch Arch. f. klin. Med., 1919, cxxviii, 165.

<sup>109</sup> Medical Record, 1919, xevi, 575.

<sup>110</sup> American Journal of the Medical Sciences, 1919, clviii, 649.



when auricular fibrillation was present did digitalis slow the heart-rate unless it was administered in quantities sufficient to produce an actual auriculoventricular block. Nor did the administration of digitalis influence blood-pressure. As Hart says, these observations are important because of the apparently wide belief that death in pneumonia is usually due to heart failure and that almost universal dependence is placed on digitalis in this condition.

Auricular flutter, as well as fibrillation, is a strong indication for the persistent giving of digitalis until a return of normal rhythm is obtained or the development of symptoms of a toxic nature force one to discontinue, at least temporarily, the use of the drug. Meakins<sup>111</sup> has recently reviewed this aspect of the subject. Even in fibrillation, however, it has been claimed that the use of digitalis is not always without harm. Halsey has reported, before the Society for Experimental Biology and Medicine, a case of auricular fibrillation in which digitalis did not improve the circulation because it increased the vagus effects which diminished the interchange between the alveolar air and the blood.

The so-called *Eggleston method* of digitalis dosage and administration is much under discussion. It has for its purpose the rapid digitalization of the patient by oral administration and it depends on the establishment of an average total amount of digitalis which is required to produce full digitalization, or the minor toxic actions of digitalis. This definition is quoted from a recent review of this subject by Eggleston.<sup>112</sup> The required dose is estimated from the potency of the drug and the patient's bodily weight; the cat-unit is used by Eggleston and is that amount of dry drug, in milligrams, which is required to kill 1 kilogram of cat when a solution is injected slowly and continuously intravenously. High-grade specimens of digitalis, when not assayed by the cat method, may be regarded as having an average activity of 100 mg. to the cat unit. Eggleston has found the average total amount of digitalis required for oral administration to man is 0.15 of one cat-unit per pound of body-weight. In order to determine the average total amount required by any given patient, one must determine the patient's weight in pounds (W), and the cat-unit of the digitalis (C. U.), then the total amount may be determined from one of the following formulas.

$$(1) \frac{C. U. \times 0.15 \times W.}{1000} = \text{grams of powdered leaf.}$$

$$(2) \frac{C. U. \times 0.15 \times W.}{100} = \text{cubic centimeters of tincture.}$$

$$(3) \frac{C. U.}{100} \times W. = \text{cubic centimeters of infusion.}$$

In other words, if a patient weighs 150 pounds and the digitalis is of high grade and has an activity of 100 mg. to the cat-unit, the results

<sup>111</sup> Canadian Medical Association Journal, 1919, ix, 606.

<sup>112</sup> Journal of the American Medical Association, 1920, lxxiv, 733.

of the three formulas will be 2.25 grams of powdered leaf in total amount, 22.5 c.c. of tincture, and 150 c.c. of infusion.

In view of the interest centering around this subject today Eggleston's further directions and comments will be quoted in full.

*Administration of Average Calculated Total Amount.* 1. When the patient has received no digitalis within the preceding ten days.

(a) *In Urgent Cases.* From one-third to one-half of the total calculated amount is administered at the first dose. After an interval of six hours, from one-fifth to one-fourth of the total is administered. After a second six hours, from one-eighth to one-sixth of the total is administered. Thereafter, if more digitalis is needed, about one-tenth of the total may be repeated every six hours until maximal digitalization is secured. In the case of the example given above with the total amount being 22.5 c.c. of tincture, the first dose would be from 7 to 11 c.c.; in the second from 4 to 5 c.c.; the third from 2.5 to 3.5 c.c., and thereafter about 2 c.c. every six hours if required.

(b) *Rapid, for Non-urgent Cases.* About one-fourth of the calculated total is to be given at each of the first two doses, six hours apart. Thereafter about one-tenth to one-eighth of the total is given every six hours.

2. When the patient has been taking digitalis within the preceding ten days.

Before further digitalis is prescribed, the patient is to be subjected to the most careful examination, including the use of polygraphic or electrocardiographic records if available to determine whether or no there are any evidences of digitalis action.

(a) *When Evidences of Digitalis Action are Absent.* The procedure is the same as outlined above, except that the total amount of digitalis required is to be reduced to 75 per cent. of the total calculated. Thus, in the example used the total would be reduced to 17 c.c. instead of the calculated 22.5 c.c., and the fraction prescribed at each dose would be based on the former figure (17 c.c.). The usual one-tenth of the total every six hours may then be prescribed if necessary.

(b) *When Evidences of Partial Digitalization are Present.* It is best not to attempt to administer more than one-half of the total calculated amount of digitalis, divided equally between the first three doses. In urgent cases in this group, however, one may administer 75 per cent. of the calculated amount, preferably in three equal doses, and then if digitalization is not quite complete, one-tenth of the total amount may be prescribed every six hours.

*Safeguards.* The appearance of one or more of the following criteria of adequate digitalization, or of minor digitalis intoxication indicates the cessation of further administration, either permanently or temporarily.

1. Nausea or vomiting (except when due to splanchnic congestion and present before treatment is begun).

2. Fall of heart-rate (not pulse-rate) to or below 60 a minute.

3. Appearance of frequent premature contractions; of definite heart-block; of marked phasic arrhythmia, or of coupled rhythm.

The observance of a six-hour interval between doses allows time for complete absorption of the preceding dose and the development of its full action on the heart so that if the patient is examined just before the administration of each dose, dangerous intoxication can be absolutely prevented. In practice it is perfectly safe to give the first three doses without personally examining the patient before the second and third doses if the one nursing the patient is properly instructed to look for nausea, vomiting or slowing of the pulse to 60 or less a minute before giving the succeeding dose, and to stop administration if any of these phenomena appear.

When a leaf, tincture or infusion the cat-unit of which is unknown is employed, 100 mg. may be taken as the cat-unit; but not more than 75 per cent. of the calculated total amount should be given in the first three doses.

When the patient cannot be weighed, or when marked edema or general anasarca is present, the body-weight (exclusive of edema fluid) must be estimated as closely as possible and the total amount of digitalis calculated as usual. Not more than 75 per cent. of the calculated amount should then be given in the first three doses.

*Comment.* The employment of this method of administering digitalis is without danger to the patient if the directions are followed in detail and if the safeguards are carefully observed. By its employment it is usually possible to produce maximal digitalis action in from twelve to eighteen hours, and marked therapeutic effects frequently appear within six hours after the initial dose. By its use it is possible to dispense with the intravenous or intramuscular administration of ouabain, amorphous strophanthin, or other digitalis body in the great majority of cases of heart failure.

Kay<sup>113</sup> reports on the results obtained with this method of administering digitalis in cardiac decompensation. In selected cases, 12 to 16 c.c. of a standardized tincture is given in the afternoon of the day of admission, and this is followed by 4 c.c. after each of the three meals on the following day. No further digitalis is then given until evidence is presented either by clinical or electrocardiographic observation that the influence of the drug is lessening; this usually commences in from three to five days. Digitalis is then administered in doses of from 1 to 2 c.c. three times a day. Kay claims that serious toxic symptoms were not produced in the series of cases in which this method was employed, while in many cases a most striking improvement was obtained within twenty-four hours. This improvement was not only evidenced by a relief of subjective symptoms but by definite objective signs; the pulse-rate is slowed, the pulse deficit is decreased in auricular fibrillation, and there is an appreciable decrease in edema.

Some additional points are emphasized by Pardee.<sup>114</sup> He found that the average rate at which digitalis is disposed of by the body is equivalent to about 22 minims of the tincture a day, but that individuals vary between as low a rate as 10 minims to as high as 40 minims

<sup>113</sup> California State Journal of Medicine, 1919, xvii, 329.

<sup>114</sup> New York Medical Journal, 1919, cx, 1064.



a day. This variation is important as is also the individual susceptibility to the drug. Weight, as we have seen above, is an important factor and Pardee suggests that on the average a total dose of 2 minims of the tincture to each pound of body-weight will produce early toxic signs. This dose might be extremely dangerous for a susceptible individual, and might be inadequate for a non-susceptible person. If this average dose fails to bring about improvement and early toxic symptoms, Pardee advises that the administration of the drug be continued. One must watch carefully for the signs of early poisoning, but not stop the digitalis until these signs appear.

Robinson<sup>115</sup> has also used the Eggleston method and has studied, in a series of 26 cases of auricular fibrillation or flutter, the question of the time of appearance of the digitalis effect, the time of maximum effect, and the duration of the influence of the drug. There has been considerable discussion in the past concerning the rapidity and constancy of absorption of preparations of digitalis from the alimentary canal of patients with heart disease. However, as Robinson says, the fact that a single large dose of the tincture of digitalis uniformly affected the heart of all of the cases in his series in which its initial effect could be determined, in from two to five hours, offers a strong argument for a fairly rapid and uniform rate of absorption. His findings indicate that the maximum effect on the heart is usually obtained in about twenty-four hours and that this effect generally continues to be effectual for from four to fourteen days, or on an average of nearly ten days. Robinson feels that further studies are required before such large doses should be recommended for general use, especially when patients are not under constant observation in hospitals. He does believe, however, that this method is entirely justified whenever rapid digitalis action is strongly indicated, and he also believes that it is a much safer method of obtaining rapid digitalis action than the intravenous administration of digitalis bodies, especially strophanthin. Nearly all the cases in his series showed striking clinical improvement within a few hours after the administration of the single large dose of the tincture of digitalis, and it is for this reason especially that he feels that Eggleston's conclusions as to the dosage of the drug are essentially correct.

STROPHANTHIN. Opposing views to those intimated by Robinson above are presented by Neumayer,<sup>116</sup> who advises that intravenous injections of strophanthin should not be employed merely as a last resort but early and on slight indications of decompensation. He claims that a few injections of strophanthin do more good than weeks of treatment with digitalis; he further claims to have never observed any harmful results from this treatment. It is evident that he was really employing it on early decompensation cases from his statement that many of the patients were treated as ambulant cases and were able to walk home after the injection. The dose he employed was 1 mg. in adults and a half of this in children; in some instances a course of

<sup>115</sup> American Journal of Medical Sciences, 1920, clix, 121.

<sup>116</sup> München. med. Wehnschr., 1919, lxxi, 716.

as many as 12 such injections were given. This rather startling paper reports results which are somewhat at variance with those obtained by others, and suggests a method of treating early decompensation which would seem to be unnecessarily and inexcusably radical. After the injection of strophanthin intravenously, Simici<sup>117</sup> and others have reported disturbances of rhythm severe enough to require active treatment with adrenalin.

**NON-MEDICINAL TREATMENT.** Stengel,<sup>118</sup> in discussing the treatment in compensated valvular heart disease, emphasizes the value and importance of non-medicinal measures; his remarks are also applicable, in a measure, to cases of early or moderate decompensation. In the cases of fully compensated valvular heart disease digitalis is, of course, not indicated, and in fact no drugs are called for unless perhaps it be a general tonic containing iron. Much, however, can be done to help a partially crippled heart to perform its necessary work with the least strain, and to safeguard it against any unfavorable influences from without. In children, the question of exercise and play is a troublesome one, but Stengel does not approve of the usual effort to prevent such children from taking any part in the games of their friends, and believes that the dangers of occasional excess have been greatly exaggerated, and his own practice has been rather to encourage than discourage play. Rougher games and competitive sports, however, are forbidden. Exercise, to be most beneficial and least apt to be harmful, should be frequent and regular rather than occasional. In adults, the question of occupation presents much the same problem; the belief that only sedentary occupations should be allowed cardiac cases is practically in the class with the plan of forbidding children with such diseases all forms of play. Stengel advises that severe and sudden muscular strains be avoided and also excessive fatigue, but he emphasizes that the milder forms of manual labor, with a reasonable amount of fresh air, will prove more satisfactory than indoor work without exercise of any kind. Certain other factors must be avoided, including rapid changes of temperature and long or constant standing. As Stengel puts it: "In general, employments which permit of moving about partly in the open air or in well-ventilated workrooms and occasionally of resting, which involve some manual work of a light sort and which do not require long hours, are most suitable." Sometimes a more arduous occupation can be carried on if sufficient rest and sleep are obtained, and in any case there is nothing of more importance than that the patient shall have enough rest and sleep; often they seem to require an inordinate amount of sleep but this tendency should be encouraged rather than discouraged.

*Diet* is also a most important detail. The proper dietary regulations are epitomized by Stengel as: Simplicity, variety and moderation, but the greatest of these is moderation. Overeating acts harmfully in a number of ways: (1) Overfilling of the stomach, especially when accompanied by flatulent distention, may prove disastrous,

<sup>117</sup> Arch. d. mal. du Cœur, des Vaisseaux et du Sang, 1919, xii, 207.

<sup>118</sup> Medical Clinics of North America, 1920, iii, 1331.

especially in elderly patients. (2) Constant overfeeding tends to cause intestinal disorders which bring in their train a number of harmful results. (3) Overeating tends to bring about constant overfilling of the splanchnic bloodvessels and this indirectly disturbs the general circulation and the heart action. Finally, overeating tends to obesity which is an added burden upon the heart; this is especially true in patients of large size. As to the diet in such patients as tend to obesity, Stengel suggests that a reduction of the usually excessive fluid intake is of primary importance. Stout patients may, with advantage, be ordered an occasional Karell diet, consisting of a restricted amount of milk and no other food; from 800 to 1000 c.c. of milk is usually the amount given.

It is interesting to note other opinions on this point, opinions which, while they have reference to cases with more decompensation than those discussed by Stengel, still bear on the same question. Krehl, in the same article quoted above in which he objects to the haphazard use of digitalis, describes very good results from absolute rest in bed on a diet of 1000 or 1500 c.c. of milk. He suggests that a rice and fruit diet with little salt and a limited water intake would accomplish a similar result. The strictness and duration of these dietary limitations will depend upon the severity of the case and the promptness of improvement.

The value of the Karell course of dietary treatment is also emphasized by Rubow,<sup>119</sup> not only in the patient with edema but also as a precautionary measure at intervals for long periods of time after compensation has been restored. The work of the heart is lightened by the diet, both as a result of an actual decrease in body metabolism and also as a result of a reduction in the circulating fluids.

To return to Stengel's article, the next point he discusses is the *care of the digestive tract*. This especially concerns the avoidance of habitual constipation, with its resulting straining. The bowels must be kept moving by mild laxative measures, if possible; sometimes, in beginning decompensation, occasional portal depletion by the use of stronger saline or other laxatives is useful. Suitable clothing must be insisted upon for cardiac cases are easily susceptible to the effects of chilling and the resulting minor infections are peculiarly dangerous to cardiac cases. Stengel advises especially, warmth of the extremities, avoidance of dampness and the wearing of a woolen abdominal band. Bathing must also be controlled. A cold or cool bath, if very brief, may be helpful as a powerful stimulus to the sluggish circulation which is so often present in the early morning in cases of mitral valve disease. Concerning climate and altitude, Stengel suggests that changeable, damp climates are undesirable because of the tendency to repeated "colds." Sea level is not always found to be the most helpful, and while it is true that high altitudes are dangerous for individuals with heart disease who have been living at a lower level, yet anything up to 1000 feet is probably not too high for safety, and often at mod-

<sup>119</sup> Hospitalstidende, 1919, lxii, 969.



erate altitudes the air is more bracing than at sea level in warm regions where there is a certain deadness of air that proves depressing.

*Infections* which could be dismissed as of no moment in a normal individual, must be considered important in any cardiac case even with good compensation, and treatment must be more thorough, conservative and prolonged. The patient should be put to bed, no matter how mild the infection may seem. This is especially true of bronchial infections which are attended with an additional risk to the heart on account of the straining and sudden elevation of blood-pressure that results from coughing. Sedatives should be freely used under such circumstances.

*Local conditions*, such as *diseased tonsils* or *adenoids*, *pyorrhea*, and *dental-root infections* must be treated as possible sources of mischief. As Stengel says, however, one must not become extreme in dealing with such trouble.

Calvy,<sup>120</sup> in discussing the question of the extraction of teeth for focal infection about the roots, points out that there may occur an increase of the heart trouble after such procedures. We are accustomed to see a lighting up of an arthritis or neuritis following the measures necessary for the eradication of the causative focal infection; it is Calvy's belief that there may occur a similar lighting up of a more or less quiet valvular infection. The cases which he reports, while very suggestive, do not show quite clearly enough the connection between the focal infection and the cardiac disease. That a cardiac case may become worse following as simple a procedure as an extraction under local anesthesia is undoubted. Still, the point is well made that in chronic cardiac cases, especially in the elderly, it behooves us to make haste slowly with regard to the radical eradication of foci of infection which may or may not be etiologically related to the cardiac disease.

*Glucose injections* as a treatment for certain types of heart disease which are classed under the general term "cardiodystrophy" have been advised by Büdingen, and Pfalz<sup>121</sup> has reported successful use of this method in general arteriosclerosis, with hypertension and angina pectoris, and in coronary sclerosis with angina pectoris and an almost normal blood-pressure.

The rationale of the treatment depends upon the hypothesis that in certain cardiac conditions, particularly in coronary sclerosis, there may occur a failure of nutrition in the myocardium due to the diminished blood flow through the diseased arteries. The glucose injections are given with the hope of supplying more nutriment to the heart muscle by increasing the sugar-content of the circulating blood; 12 to 20 per cent. glucose solution is employed and 200 to 300 c.c. is administered at intervals of a week. Further evidence will be needed before this method of treatment can be unreservedly approved.

<sup>120</sup> Journal of the American Medical Association, 1920, lxxiv, 1221.

<sup>121</sup> Deutsch. med. Wehnschr., 1919, I, 1181.

**Diseases of the Aorta.** AORTITIS. An editorial in the *Journal of the American Medical Association*<sup>122</sup> comments upon the fact that in recent years the importance of *syphilis of the aorta* in the production of a variety of clinical pictures has been emphasized with increasing frequency. The editorial suggests that this is due to advances in the methods of detecting syphilis and that physicians generally have not realized the frequency and importance of syphilitic aortitis. Figures from Schrumpf<sup>123</sup> are quoted to show that over 5 per cent. of syphilitic males may be expected to show definite changes in the organs of the circulation, and three-fourths of these will be cases of syphilis of the aorta, either with or without aneurysm. The diagnosis of syphilitic aortitis is then discussed and the impression given that in the early and presymptomatic stages it is impossible or nearly so, to arrive at this diagnosis. When symptoms such as substernal pain have appeared it is probable that the lesions are quite extensive, and that the most favorable moment for therapy has passed. It is evident that the editorial conveys the thought that the roentgen ray and the Wassermann reaction offer the most hopeful assistance in the early recognition of this condition.

To this view, Hoover<sup>124</sup> strongly objects. In the first place, he refers to the fact that the diagnostic signs of aortitis were clearly described long before the roentgen ray or the Wassermann reaction or the spirochete was known to the medical profession. He believes that "in the hands of an examiner who in a routine manner estimates the size and elasticity of the ascending aorta, just as the character of the arterial pulse is studied, the presymptomatic period of aortitis is diagnosed with fully as much accuracy as can be procured by aid of the roentgen ray and Wassermann reaction." Fortunately for the diagnosis, the ascending or first part of the arch is involved in fully 95 per cent. of cases and it is this portion of the aorta which is most available for examination, and accessible and susceptible to very accurate criticism as far as its size and elasticity are concerned. The change in the aorta which thus permits of recognition is an elongation and dilatation secondary to the deterioration of the smooth muscle fiber of the aortic wall. The increase in size of the aorta, according to Hoover, need be very little to give unequivocal evidences to physical examination.

The physical signs which Hoover describes are: (1) Increased resistance and diminished resonance in the second interspace to the right as compared with the second interspace to the left of the sternum; in eliciting this sign, it is best to employ direct percussion with the extended finger. (2) An increase in pulsatory expansion of the aorta during systole may be detected by palpating bimanually with the examiner's right hand over the second interspace at the right of the sternum, and his left in the interscapular space at the left of the vertebrae. Hoover also advises auscultating with the ear directly applied to the chest, and coincidently with the audible sound the examiner

<sup>122</sup> *Journal of the American Medical Association*, 1919, lxxiii, 1615.

<sup>123</sup> *Arch. f. Dermat. u. Syph.*, 1919, cxxvi, part 3.

<sup>124</sup> *Journal of the American Medical Association*, 1920, lxxiv, 226.

will often perceive over the aortic area during systole an expansile anteroposterior expansion. (3) The enlargement of the ascending arch of the aorta is evidenced by accentuation of the aortic second sound and by a palpable diastolic impact perceptible at the second interspace to the right of the sternum. High aortic pressures do not give an accentuated aortic second sound, and accentuation means just one thing—increased accessibility of the first portion of the arch of the aorta, which may, in some instances, be due to displacement and uncovering of the arch by the retraction of a diseased upper right lobe of the lung. The diastolic impact is best appreciated by standing at the right side of the patient and palpating the second interspace to the right of the sternum with the ends of the metacarpals, asking the patient to expire so as to render the aorta as accessible as possible. (4) The second aortic sound will be tympanitic in quality and a systolic murmur will be audible if the ascending arch and the root of the aorta are sclerosed but the valves remain competent. Fusiform enlargement alone of the ascending arch will give the signs described under the first three headings, but will not lead to a tympanitic second aortic sound or a systolic murmur. Syphilitic mediastinitis may sometimes be recognized by the presence of a friction sound audible at the second interspace to the right of the sternum during cardiac diastole and following the aortic second sound.

Hoover gives the credit for the early recognition of syphilitic aortitis to two great Frenchmen, Fournier and Huchard, and states that it is based on physical examination. He does not believe that the diagnosis of incipient syphilitic aortitis is made with any greater frequency since the roentgen ray and the Wassermann reaction were added to our diagnostic resources than was the case prior to the introduction of these diagnostic aids.

From the point of view of the roentgenologist, Martin<sup>125</sup> makes the following conservative statements: "There has in recent years been an ever-increasing tendency to use the roentgenogram in the diagnosis of syphilitic aortitis. That it is a very valuable adjunct to the clinical findings there can be no doubt; but I wish to emphasize the importance of a conservative interpretation of a widened shadow of the great vessels.

Arteriosclerosis, hypertension, chronic endocarditis, a high diaphragm, or a dilated pulmonary artery may give a similar picture, and it is perhaps wiser for the roentgenologist to suggest the diagnosis of aortitis only in those cases that show a localized prominence at the base of the ascending aorta."

That even marked signs and symptoms of aortitis are not always due to organic change is suggested by Cantelli.<sup>126</sup> He describes 3 cases in which a rapid disappearance of signs and symptoms, in 1 case in twenty days, confirmed his belief that disturbance of the nervous control of the ascending aorta may lead to a temporary paralytic relaxation with the appearance of signs and symptoms suggesting an

<sup>125</sup> Journal of the American Medical Association, 1920, lxxiv, 723.

<sup>126</sup> *Rif. Med.*, 1919, xxxv, 995.



organic dilatation. In these cases rest and suitable diet were sufficient to bring about relief.

Reid<sup>127</sup> reporting on the prognosis of specific aortitis comes to the following conclusions: Specific aortitis is a disease of progressive character and of serious prognosis. The weight of evidence is against the power of mercury and potassium iodide alone to procure an arrest of the disease. Intensive antisyphilitic therapy is now being administered with promising results. Every case presenting the symptoms of substernal pain and shortness of breath, not definitely explained by other cause, should be promptly studied as to the presence of specific aortitis. Early diagnosis is imperative.

The question of the treatment of syphilitic aortitis is also discussed by I. MacKenzie,<sup>128</sup> whose opinion agrees with the experience of others. Great care must be taken in the use of specific intravenous medication in this group of cases; the patient must be gotten into as good general health as possible by preliminary hygienic and dietetic measures. Every care must be taken to avoid the reactions which sometimes follow such injections and indeed it may be considered contraindicated to employ this method of treatment in patients in whom such a reaction might prove dangerous. It is interesting to note that Josué,<sup>129</sup> in the treatment of angina pectoris, which he believes to be usually of syphilitic nature, found that arsphenamin had a tendency to cause acute pulmonary edema in these cases. He obtained better results by the use of mercury cyanide in doses of 1 cgm. every two days for a series of 15 intravenous injections.

**ANEURYSM OF THE AORTA.** Two rather rare cases have been reported within the past year, both of which deserve mention. The first is an instance of the so-called "dissecting aneurysm" reported by C. and L. Walker;<sup>130</sup> that such cases are rare is evidenced by the fact that the authors had not met with a previous case in some 2500 necropsies. In this instance, a man, aged sixty-five years, apparently in good health, fell down suddenly and nearly died. Slight recovery took place and there was complaint of severe substernal pain, and pain and paresis in the left leg. Death occurred suddenly a day and a half later. At autopsy, the aorta was found to be markedly atheromatous, and a large section of the intima of the aorta was found lying free in the lumen of the vessel. In dissecting aneurysms, the blood usually works its way between the intima and the media, separating these two layers of the wall of the aorta; rupture at some distance from the site of origin may occur. In this instance, however, no rupture took place, but a sudden detachment of a large part of the aortic intima. The authors discuss the probable mechanism which brings about this type of aneurysm, but fail to arrive at any very satisfactory conclusions.

**RUPTURE OF AN AORTIC ANEURYSM INTO THE LEFT INNOMINATE VEIN** is a very rare accident: Pepper and Griffith, in 1890, found but 29 cases

<sup>127</sup> Journal of the American Medical Association, 1919, lxxiii, 1832.

<sup>128</sup> Glasgow Medical Journal, 1919, xcii, 209.

<sup>129</sup> Paris Médicale, 1919, ix, 1.

<sup>130</sup> British Medical Journal, 1919, ii, 200.

in the literature, sixteen years later Fussell was able to add 7, and Herrick<sup>131</sup> recently has reported 1 case and added 6 others from the literature making a total of 43. This total includes for the most part cases in which the rupture was into the superior vena cava while in Herrick's case the rupture was into the left innominate vein less than 1 cm. from the cava. The aneurysm had its origin 4 cm. above the aortic valves, and its rounded sac pressed against the superior vena cava near the heart shutting off the circulation in the superior cava and blocking the azygos vein. There was an old and active luetic aortitis; the innominate and azygos veins were hugely distended. Herrick's patient was a male, aged thirty-three years, with a strongly positive Wassermann test. He was known to have some form of aortic disease and suffered from cough, dyspnea, and pains in the chest. One evening, as he was ascending the stairs, he experienced a feeling as of something giving way in his chest and he lost consciousness. After regaining his senses he turned on the light, looked in the mirror and saw that his face and neck were greatly swollen and almost "black in color." The patient lived for six weeks from the date of rupture but suffered from distressing dyspnea, coughing spells, with strangling sensations and extreme cyanosis. Herrick first saw the case five weeks after the accident, and his graphic description may well be quoted in full.

"The neck and face, as well as the wall of the chest, were swollen as in the anasarca of chronic parenchymatous nephritis; the injected, bulging eyeballs could be seen through the narrow slits left between the swollen lids. But instead of the pasty pallor of the nephritic facies, there was a purplish, almost black color, such as is seen only in the most extreme degrees of cyanosis. The visible veins were distended and tortuous. But no feature was more remarkable than the sharp contrast between the bloated, dark, upper half of the body and the pale, emaciated lower portion. The legs were the spindle legs of one in the terminal stages of a wasting disease, with no swelling and no pitting on pressure. There was no sign of free fluid in the scrotal sac or in the abdominal cavity.

The liver was just palpable. The abdominal wall itself was not edematous except slightly so above the umbilical level. The line of separation between the non-swollen, pale, flaccid abdominal wall and the swollen, purplish, chest wall, whose skin and subcutaneous tissue felt hard and brawny, pitting only on quite firm pressure, was almost as clear-cut as is the line of demarcation in a case of gangrene, being distinctly marked close to the costal margins."

The heart area was difficult to determine, but it was plain that there was an increased area of dulness at the base of the heart and over the manubrium. At the base of the heart a continuous murmur, soft, blowing, somewhat humming was heard and it had a distinct accentuation synchronous with ventricular systole. This murmur resembled those which Herrick has heard in cases of patent ductus Botalli. A

<sup>131</sup> American Journal of Medical Sciences, 1919, clviii, 782.

roentgenogram revealed a shadow as from an aneurysm of the first or transverse portion of the aorta.

This case is quite classic in its conformity to the condition as portrayed by Pepper and Griffith, and in such a typical case there is little difficulty in diagnosis. Atypical cases, however, have been reported in which the correct interpretation of the symptoms is far more difficult. There is little that can be done for these patients except in a palliative way.

While we are discussing rare types of aneurysm, let us refer briefly to two reports concerning *aneurysm of the left ventricle*. These belong rather to diseases of the myocardium, but may be pardoned here because of their aneurysmal nature. Lutembacher<sup>132</sup> points out that aneurysm of the left ventricle is usually first diagnosed at the necropsy table, for signs and symptoms during life are usually few. He points out that even the roentgen-ray may give no assistance. In several cases, however, his attention has been called to the occurrence of sharp pain near the apex and localized adhesions of the pericardium. This combination is to him suggestive, and if, in addition, one finds an apparent left ventricular enlargement, in the absence of aortic disease or hypertension, one may be justified in considering the possibility of aneurysm of the heart. That such cases are frequently symptomless is emphasized by the case reported by Wilson.<sup>133</sup> A woman, aged sixty years, had never been ill and had been in excellent health. For some twelve hours preceding her sudden death she suffered from what was considered to be an attack of stomach trouble. While attempting to vomit, she died suddenly. At necropsy, the pericardium was found distended with blood, the heart was small. About one inch above the apex a rupture of the left ventricular wall was found which, on section, proved to have taken place in the center of an aneurysmal dilatation. At the point of rupture the aneurysmal wall was little thicker than brown paper. In other respects the heart appeared to be normal, except that the muscle was somewhat thin and pale.

The *treatment of aortic aneurysm*, outside of rest and diet, resolves itself into two procedures, the first being the antisyphilitic treatment of cases due to the spirochetal infection, and second the treatment by wiring and electrolysis. The first of these is discussed by MacLachlan.<sup>134</sup> This author emphasizes that too often aortic aneurysm of syphilitic origin is regarded as hopeless from the view-point of therapy. Rest will often relieve all symptoms and the author advises three months' absolute rest in bed except for going to the toilet, followed by limitation in physical work for the remainder of the year. Diet is probably of minor importance, and there seems to be no advantage in having the patient undernourished. Greater emphasis should be placed on active, long-continued antisyphilitic treatment. Potassium iodide may be of great assistance in the treatment of thoracic pain due to aneurysm, but potassium iodide alone is not sufficient for it does not kill the spirochete

<sup>132</sup> Arch. des mal. du Cœur, des Vaisseaux et du Sang, 1920, xiii, 49.

<sup>133</sup> Lancet, 1919, ii, 199.

<sup>134</sup> American Journal of the Medical Sciences, 1920, clix, 525.



and so does not stop the inflammatory process in the wall of the aneurysm. Maclachlan insists that mercury and arsphenamin must be added and their use continued for a long time. He has found arsphenamin can be administered with safety to cases with aneurysm and has never seen any ill-results after giving many injections. The dose should always be small and repeated at weekly intervals; at least 12 injections should be given, the first 6 being 0.2 gm. and the remainder 0.3 gm. in not more than 100 c.c. of water. Mercury in some form should be given and potassium iodide in doses of about 1 gm. three times a day.

The continuation of this treatment depends on the Wassermann reaction and the patient's general condition, but it is the intention to treat all cases actively for at least two or three years, if it is feasible. In 3 cases of aneurysm of the aorta due to syphilis, 2 of them of massive size, which Maclachlan was able to follow for periods of from fourteen months to three years, there occurred a marked general improvement under medical treatment. Symptoms disappeared, ability to perform the day's work returned and there was a general improvement in health. Signs of a dilated aorta persisted and the roentgen-ray picture showed little, if any, change. The Wassermann reaction became negative. The author admits that he has but few cases to refer to and that they have not been followed very long, but he is favorably impressed with the results so far observed, and therefore feels justified in recommending more active antisyphilitic treatment for aortic aneurysm.

The value of wiring as a treatment for aortic aneurysm is presented by Hare,<sup>135</sup> who has had a series of 30 cases, an unusually large number for one observer. The summary of the essential points for success which Hare gives in his recent article is as follows:

1. The aneurysm must be sacculated, not fusiform, and if it be of the dissecting sacculated type it is the most favorable for good results. It is not only useless, but dangerous, for obvious reasons, to operate on a fusiform aneurysm.
2. Although it is not at all necessary for aneurysm to have eroded the chest wall so as to protrude, it must be close enough to the chest wall anteriorly or posteriorly to permit the insulated needle to enter the sac.
3. The wire must be of gold and platinum so that it will coil properly in the sac. A gold-copper wire is useless, because the copper is eaten out so rapidly by electrolytic action that the procedure cannot be completed.
4. Great care must be taken that the skin over the sac is protected from electrolytic action by having the external part of the needle well insulated as well as the shank.
5. Depending on the size of the sac, the amount of wire varies, but it is usually from 15 to 20 feet.
6. The time during which the current is allowed to pass is usually about forty-five minutes, and the current strength must be turned on and off very gradually.

<sup>135</sup> Journal of the American Medical Association, 1919, lxxiii, 1865.

7. If the street current is used, great care must be taken that the proper reducing apparatus is employed, and also that the table on which the patient lies is insulated with rubber pads and that the operator and his assistant wear rubber-soled shoes.

On the other hand, the condition which stands in the way of complete success is the extensive disease of the aortic wall; other parts of the aortic wall give way later, despite the more or less successful filling of the aneurysmal sac with clot. It is therefore the state of the vessels and of the remainder of the aorta which determines prognosis rather than the size or location of the sac. Of course, this is true to only a limited degree, for when the growth is very large, and particularly if its pressure has already begun to cause pulmonary edema or pleural effusion, the procedure is, of course, a forlorn hope. Relief of pain and arrest of the progress of the growth, at least in the direction in which it threatens to rupture, are the chief values of this treatment. In judging the results it must be remembered that many of the cases wired by Hare had large saccular aneurysms with definite external pointing, threatened rupture and terrific pain. And so when Hare states that his best result has been in the case of a man who lived in comfort for three years although threatened with pulmonary edema when operated on, we realize that this is in fact a most remarkable therapeutic result.

**Diseases of the Arteries and Veins.** CORONARY SCLEROSIS. The many deaths from influenza of previously healthy young people during the epidemic of influenza last year was taken advantage of by Orliansky<sup>136</sup> to examine at necropsy for sclerosis of the coronary arteries. The figures are interesting; between the ages of eighteen and twenty sclerosis or fatty degeneration was found in 23 per cent., between twenty-one and thirty the frequency of occurrence rose to 46 per cent., while in the patients whose ages fell between fifty and sixty, only 12.8 per cent. showed normal coronary arteries. This early development of changes is found more frequently than one might anticipate in the young, and less constantly than might be expected in those past fifty.

CORONARY THROMBOSIS does not invariably cause sudden death. A year or more ago Herrick, in writing of this subject, divided the cases into three groups: Those cases of instantaneous death without death struggle; cases of death within a few minutes or few hours after the obstruction; cases of severity in which death is delayed for several hours, days or months, or in which recovery occurs. A case in which the patient lived for a period of thirteen days after the onset of the first symptoms has been recently reported by Acker.<sup>137</sup> The patient was only thirty-four years of age and had had no previous attacks of pain or cardiac distress. At necropsy, the heart was normal in size and somewhat pale; there was a partially organized thrombus in the ramus descendens anterior of the left coronary artery. The heart showed an anemic infarct. No other pathology was found.

<sup>136</sup> Rev. med. d. l. Suisse Romande, 1919, xxxix, 276.

<sup>137</sup> Journal of the American Medical Association, 1919, lxxiii, 1692.

A case report by Finley<sup>138</sup> reminds us of the occurrence of thrombosis of the veins in cardiac disease. Welch has shown that thrombosis in heart disease usually attacks the veins leading from the upper extremity, and more frequently on the left than right side. The condition arises chiefly in mitral stenosis; its localization in the upper part of the body and especially on the left side is attributed by Welch partly to the greater length and obliquity of the left innominate vein, partly to the pressure on the left subclavian vein by a dilated left auricle and dilated pulmonary vessels. In Finley's case the left pulmonary artery was found completely occluded by clot, the left subclavian also completely occluded by organized clot and the right filled with granular pink thrombus. Clots were also found in both the superior and inferior vena cava. The heart showed multiple mural thrombi and a very early acute endocarditis of the aortic valve; cultures isolated the *Staphylococcus aureus*.

Fehling,<sup>139</sup> in discussing the prophylaxis of thrombosis in gynecological procedures, reviews the methods which have been employed in attempting to avoid this complication. The intravenous injection of a 0.5 per cent. solution of citric acid has been used to reduce the tendency to coagulation, and citric acid has been given by mouth for the same purpose. Herudin has been injected in doses of 1 gm. repeated in four hours, and injections of sugar solutions have also been tried. It is possible that some of these measures might prove of value in the prophylaxis or treatment of thrombosis in medical conditions.

INTERMITTENT CLAUDICATION. Cornet's<sup>140</sup> case is described in the English summary at the end of the article as "an old-aged lady, attacked by renal sclerosis, which presented arteritis of the posterior left tibia." The condition was extremely painful until treatment by the application of an elastic band around the upper third of the thigh was instituted. This relieved the pain at once and a disappearance of the associated symptoms, edema, hypothermia and hypoaesthesia also took place. The elastic band was applied just tight enough not to stop the pulse in the dorsal artery of the foot; it was kept on for two hours and repeated twice the following day. This, of course, is not a new application of the principle of Bier's hyperemia but such good results are interesting and stimulating.

THROMBO-ANGELITIS OBLITERANS has received but little attention in the recent literature. Three papers, published together, review some of the views on this subject. Meyer<sup>141</sup> is inclined to consider intermittent claudication as being in many instances an early stage of thrombo-anginitis obliterans. He believes that the condition is a systemic disease due to the smoking of tobacco by individuals of a certain stamp. The only real cure for this disease in his belief, is prophylaxis. People so constituted as these people are should not smoke. On the other

<sup>138</sup> Canadian Medical Association Journal, 1919, ix, 877.

<sup>139</sup> Zentralbl. f. Gynäk., 1920, xlv, 1.

<sup>140</sup> Jour. de Méd. de Bordeaux, 1919, xc, 427.

<sup>141</sup> Medical Record, 1920, xcvii, 425.



hand, Buerger<sup>142</sup> continues to believe that (1) Thrombo-angietis obliterans is a disease in which an acute inflammatory lesion and occlusive thrombosis of arteries and veins are the characteristic lesions; (2) that from the mechanical point of view and from the standpoint of symptomatology, the thrombotic occlusion is the most important phenomenon; (3) that the thrombosis is probably preceded, and certainly accompanied, by an acute inflammatory or exudative stage; (4) that the lesion involves deep veins in about 40 per cent. and the superficial veins of the upper and lower extremity in 20 per cent. of the cases; (5) that recent investigations of the veins show that the acute lesions in the superficial vessels and the deep vessels are identical; (6) that the histological changes in the veins point to the existence of an infectious process. The evidence presented by Buerger seems most convincing and one cannot help but agree with his view of the question.

There has been some attempt to advance hyperglycemia as a symptom of thrombo-angietis obliterans. Bernhard,<sup>143</sup> however, found in 92 per cent. of 36 verified cases that the blood sugar after fasting over night was within normal limits of concentration, and that it did not show an abnormal reaction to the glucose tolerance test. In only 3 cases did he obtain definitely abnormal results. Nor was he able to demonstrate any change from the normal in the nitrogenous constituents of the blood, in the cholesterol, chlorides, calcium, or in the carbon dioxide combining power of the blood plasma.

From Korea comes a report of 4 native cases of thrombo-angietis obliterans by Ludlow.<sup>144</sup> All were in males who used tobacco.

NOTES ON BLOOD-PRESSURE. The importance of the peripheral arteries and capillaries in the maintenance of normal circulation is being more and more emphasized. Wiesel and Lowy<sup>145</sup> describe certain changes in the peripheral arteries which they claim are responsible for many clinical symptoms. These symptoms are usually interpreted as resulting from failure of the myocardium, or are believed to be due to vasomotor influences, but, according to these authors, there are definite pathological changes in the walls of the vessels. Nor are the capillaries to be thought of as having no independent control of the flow of blood through their spaces. Krogh<sup>146</sup> has advanced evidence in favor of the view that even the smallest capillaries are capable of independent dilatation irrespective of contraction or dilatation of the corresponding arterioles. The concept of large capillary beds being at one time open and at another moment at least partially closed to the blood flow is most important in our appreciation of certain phenomena of shock; no more satisfactory explanation has been advanced for the apparent disappearance of large fractions of the total blood volume from the circulation. "Capillary tone" now has a real meaning.

Some rather unexpected findings reported by Cyriax<sup>147</sup> may find their

<sup>142</sup> Medical Record, 1920, xcvii, 431.

<sup>144</sup> China Medical Journal, 1920, xxxiv, 18.

<sup>145</sup> Wien. klin. Wchnschr., 1919, xxxii, 1083.

<sup>146</sup> Journal of Physiology, 1919, lii, 457.

<sup>147</sup> Quarterly Journal of Medicine, 1920, xiii, 148.

<sup>143</sup> Ibid., 430.

explanation in changes in "capillary tone." Cyriax found that in unilateral or bilaterally unequal conditions, whether from trauma or operation, and irrespective of site (head, limbs or trunk), the blood-pressures in the two arms nearly always show marked differences. Such differences are not noticed when the trauma is in the midline or involves the two sides equally. The first observations were made in cases of war wounds, and Cyriax has studied 36 cases of arm and leg injuries, as well as 73 similar cases including injuries of the head, thorax and abdomen. As a rule, the maximum pressure on the side of the injury is higher for a day or two than on the other side, then the relation between the two sides is reversed. If convalescence proceeds normally, there is a rapid return to equality, but a delay in improvement of the local injury delays the equalization of the pressures in the two arms. The maximum pressures showed a difference of 10 mm. in 83 per cent., of 20 mm. or over in 12 per cent. The changes in the minimal pressures were similar but apparently independent of the changes in the maximum pressures. Cyriax feels that because of these findings unilateral readings of blood-pressure are often misleading, and that bilateral readings should always be made.

Another precaution which is advised in the recording of blood-pressure concerns the position of the arm. Kahn<sup>148</sup> finds that the normal reading varies considerably with the arm in different positions, whether the patient is seated, standing or in the recumbent posture. As the arm is raised upward, there occurs normally a progressive fall of the systolic and diastolic pressure readings, the amount of fall being proportionate to the elevation. In cases of neurocirculatory asthenia the fall of pressures is more marked than normal and it is most precipitate in cases of hyperthyroidism. On the other hand, in nephritic hypertension, the fall in pressure is much less marked than in normal cases. As might be expected, the diastolic pressure falls more steeply than the systolic in aortic regurgitation.

Tixier<sup>149</sup> reports a study of the normal and abnormal variations of blood-pressure as determined by prolonged observation. The conditions were carefully controlled and all external stimuli, as far as possible, were excluded. The patients were seated with the arm resting on a table. After some practice the observer was able to record two or three readings a minute, and this was done for the first two minutes, and then further observations were made at minute intervals for the duration of the test, which varied from five to twelve minutes.

It is only exceptionally that the pressure fails to change from minute to minute, especially do variations in the systolic pressure appear. In 85 per cent. of the individuals studied the curves agreed with the normal curve described by Gallavardin; that is to say a moderate, but progressive, drop in systolic pressure with a less marked lowering in the diastolic figure, for example, a drop from 120 mm. Hg. to 100 in the systolic and from 70 to 60 in the diastolic pressure. It is to be

<sup>148</sup> American Journal of the Medical Sciences, 1919, clviii, 823.

<sup>149</sup> Arch. des mal. du Cœur, des Vaisseaux et du Sang, 1919, xii, 337.

noted that the descent in the systolic pressure may be interrupted by occasional temporary rises.

The abnormal responses were found in only 15 per cent. of individuals examined and indicate definite alteration of the cardiovascular apparatus.

The abnormal curves fall into several groups: (1) Those which show throughout the test no alteration in the blood-pressure formula; this type is apt to be seen in patients who have been in bed for sometime and whose systolic pressure has sunk to a low and constant level. Other varieties include an excessive drop in systolic pressure, a progressive rise in either systolic or diastolic pressure, and a smaller group of irregular reactions.

Tixier believes that by such observations one may determine the degree to which the heart, in a given patient, is under the control of the central nervous system. For example, the irregularity of the reaction in the group of patients complaining of palpitation and shortness of breath forming the group known as cases of Effort Syndrome.

The author also emphasizes the practical importance of these findings in regard to the inaccuracy of drawing too fine conclusions from single readings of the peripheral blood-pressure.

The arterial circulation in infants has been investigated by Lesné and Binet<sup>150</sup> by the use of a small arm band and the oscillometric method. In the normal infant, the pressure rises steadily during the first eight months or so. One must be careful to make the readings while the infant is quiet, as crying or nursing raises the maximal pressure. In premature infants there is markedly low pressure, and a similarly low pressure is found in athreptic infants. Sleep also lowers the pressure somewhat, and gastro-intestinal disturbances, as well as pulmonary tuberculosis, also lead to a reduction in pressure; minor infections are without influence.

The sounds heard in the peripheral arteries in aortic regurgitation have been a source of much discussion and argument for many years, and many theories have been advanced in explanation.

In order to disprove a statement that the femoral sounds heard in aortic insufficiency are due to a transmission of the heart sounds through the blood-column, and that the sound over the brachial artery heard in taking the blood-pressure is due to transmission from closure of the aortic valve, Jamieson and Wilson<sup>151</sup> studied this question most carefully. In fact they expended more energy than the statement, which they wished to prove in error, deserved. They recorded electrocardiograms simultaneously with the pistol-shot sound in the femoral and with the pulse wave in the posterior tibial. It was found that the pistol-shot sound and the pulse wave were always closely associated, the sound coming very nearly with the onset of the first upstroke of the pulse. Also, it was found that the interval between the cardiac contraction and the pistol-shot sound was much too great to permit of the interpretation that the sound had been produced by the contraction.

<sup>150</sup> Arch. de Méd. des Enfants, 1920, xxiii, 69.

<sup>151</sup> Heart, 1919, vii, 65.



Third, the interval between the occurrence of the sound in the femoral and in the dorsalis pedis corresponds with the rate of blood flow and is impossibly long for sound transmission, although there are no definite figures at hand for this latter along the blood-column in the arteries. The authors therefore conclude: The pistol-shot sound is not transmitted from the heart but is produced, at the point where it is heard, by the impact of the pulse wave.

The "double crural sound" originally described by Conrad in 1860, was attributed by him to cardiac sounds propagated along the vessels. Traube believes it to be a characteristic sign of aortic regurgitation but Pezzi<sup>152</sup> disagrees with this view and favors the explanation of Dagnini, that it is a phenomenon of mixed arterial and venous origin. Pezzi from his own observations, believes that this sign is not a pathognomonic sign of aortic regurgitation but is an evidence of an insufficiency, more or less marked, of the myocardium in a case of aortic insufficiency. He has never been able to demonstrate this sign in perfectly compensated aortic insufficiency. It, therefore, has a certain prognostic value.

**HYPERTENSION.** The significance of hypertension, its relation to arteriosclerosis and nephritis and its etiology are the subjects discussed in a most interesting article by Moschcowitz<sup>153</sup> which unfortunately does not lend itself to satisfactory review. In brief, it is his theory that the conventional classification of hypertension into essential, arteriosclerotic and nephritic is not justifiable on etiological ground, and that the vast majority of disorders associated with persistent hypertension begin as "essential" hypertensions, and if untreated, lead to the clinical concepts of arteriosclerotic, nephritic and other hypertensions. In other words, he claims that all available evidence seems to show that arteriosclerosis of almost every variety is the result of the hypertension itself or (less likely) of the cause that brought about the hypertension. Even the pathological changes in the kidney of Bright's disease may be the result, rather than the cause, of hypertension; if this hypothesis were true, and there is evidence in its favor, it would support the primary vascular origin of the lesions in the kidney in nephritis. Moschcowitz goes even further and suggests that the majority of the many "types" of chronic nephritis are in reality merely stages of one and the same pathogenesis, and that arteriosclerosis and Bright's disease have the same pathogenesis, the lesion in each merely being modified by the nature of the organ.

All this is hypothesis and reminds one of the old problem of the hen and the egg; at the same time it is valuable in that it starts one thinking and also reminds us that there is little scientific basis for many of our accepted beliefs concerning hypertension. Moschcowitz describes the type of person, physically and psychically, in whom hypertension is likely to occur. The patients are overweight and sometimes even obese. The neck is short, the muscles are soft and their bodily movements are sluggish. Psychically, these people are tense, serious and irritable; phlegm and hypertension are antagonistic. They have no hobbies and

<sup>152</sup> Arch. d. mal. du Coeur, des Vaisseaux et du Sang, 1919, xii, 547.

<sup>153</sup> American Journal of the Medical Sciences, 1919, clviii, 668.

"do not believe" in vacations; as a rule they are successful, but have lost their sense of humor and the capacity for play. This type is the antithesis of the child, both in mind and spirit. A knowledge of the type may prove of value in prophylaxis.

Under the title *Vascular Reactions in Vascular Hypertension*, O'Hare<sup>154</sup> reports a study of the influence of mental and physical rest, excitation, exercise, nitroglycerin, and adrenalin on such hypertension. As a result of his observations on the lowering of vascular hypertension by combined mental and physical rest, he states that he has yet to see a long-continued fall in pressure resulting from any method of treatment (except rest) that cannot be duplicated or exceeded by those observations made on rest. By this latter means the pressure in such cases may be markedly reduced, but, unfortunately, on the resumption of effort it rises again. Exercise or mental excitation usually cause an abrupt rise; nitroglycerin produces practically no fall in pressure and indeed a prompt and transitory rise may follow its administration. O'Hare is convinced of the uselessness of nitroglycerin in hypertension and believes that more can be accomplished simply by rest. He does not, however, deny the value of this drug in the treatment of angina pectoris. Adrenalin, on the other hand, brings about a marked rise of pressure immediately after its injection. In conclusion, he states that the vasomotor system in vascular hypertension is extremely labile and sensitive.

Hypertension in women without signs of renal diseases is discussed by Riesman.<sup>155</sup> He emphasizes the following points as having possible etiologic significance: multiple gestations, worry, constipation and the menopause. Symptomatically, these patients often present but little and the physician is amazed to find an extremely high blood-pressure in the absence of any evidence of kidney deficiency. Prognostically, it is important to bear in mind that in such cases even high pressures are well tolerated for many years, although the possibility of the development of angina pectoris, apoplexy with hemiplegia, or myocardial exhaustion must be kept in mind.

*Treatment of Hypertension.* Allen<sup>156</sup> reviews the data concerning the part played by salt and fluid in the production and maintenance of arterial hypertension and comes to the conclusion that many of the failures in the treatment of such cases by salt and fluid restriction are to be explained by lack of care in the details of the treatment. In the first place, a diet which is reasonably satisfying and at the same time sufficiently poor in salt is not so easy to arrange as it may appear. It may be thought that strict abstinence from salt has been maintained, when analysis will show the blood chlorides undiminished and a output of from 5 to 10 grams of chloride in the twenty-four hour urine. Second it is difficult to know just how low it is safe to reduce the intake of chlorides; in normals 2 gm. per day is believed to be sufficient but in certain nephritics salt may be needed for its diuretic action to ward off uremia. It is probably necessary to determine the rate of reduction

<sup>154</sup> American Journal of the Medical Sciences, 1920, cliv, 369.

<sup>155</sup> Journal of the American Medical Association, 1919, lxxiii, 330.

<sup>156</sup> Ibid., 1920, lxxiv, 650.

and the low level in each patient individually. Third, the salt privation may result in weakness and other symptoms, and, at best, the restriction of salt or fluid is only palliative and does not cure the fundamental condition. Nevertheless, Allen feels that the benefit of suitable chloride restriction for hypertension is still great, in making the patients more comfortable, diminishing the danger of apoplexy, and possibly checking the progressiveness of the disorder. The results in 20 cases which Allen gives are very impressive; all of the cases were chronic and some were known as highly severe cases which had proved intractable to a variety of customary treatments for several years. The only measures employed by Allen in these cases were dietetic, and the patients were not even kept at rest. Definite reductions in both systolic and diastolic pressures and in urea retention were quite constant results of the therapy.

Some cardiologists have claimed that baths of the Nauheim type, more especially the effervescing variety, raise the blood-pressure in cases of hypertension. Thorne<sup>157</sup> strongly opposes this view and states that he has never found a single instance in which both pressures did not fall in the bath, sometimes to the extent of 30 to 50 mm. Hg. As a result of his observations, he concludes that all cases of hypertension, whether sclerotic or presclerotic, derive great benefit from a properly administered course of "Nauheim" baths.

Following out his views on the nature of hypertension, which are quoted above, Moschcowitz<sup>158</sup> outlines his treatment of this condition. He discusses it under headings: 1. Instruction of the Patient. 2. Reduction of Diet. 3. Exercise and Play. 4. Drugs. Under the first of these headings he emphasizes three points: The patient must be reassured, he must not be allowed to "retire" from business unless to be occupied in some other manner, he must be instructed in the very great value of holidays. Under the heading Reduction of Diet, Moschcowitz insists that there is no evidence that unqualifiedly proves that a high protein diet, especially of meats, is harmful in hypertension. What is desired is that the patient shall weigh no more and no less than that weight at which both the subjective and objective improvement is greatest. This weight will usually be found to be below that of the patient when he comes for treatment and will be found usually to be lower than that which the conventional tables for normal weight in proportion to height prescribe. Limitation of diet will be necessary in a great majority of patients with hypertension to reduce them to this desired level but there is no reason why these patients should suffer hunger. A simple diet consisting principally of fruit, coffee or tea (without sugar), meat, green vegetables, salad, cheese and a limited quantity of bread is quite adequate and satisfactory. Alcohol is excluded because a good reduction cure is impossible with it, not because it has any direct influence upon hypertension or hypertensive states.

Exercise is to be encouraged but it must be systematic and not too strenuous; golf or walking is the best. There are three indications for

<sup>157</sup> Practitioner, 1920, civ, 379.

<sup>158</sup> American Journal of the Medical Sciences, 1920, cliv, 517.



rest; severe circulatory insufficiency, the signs of impending cerebral hemorrhage, and third, rest is especially indicated in cases of long-standing hypertension, with marked aggravations of all the focal organic signs, with severe dyspnea and general enfeeblement. Such patients gladly take to the idea of spending one entire day of every week in bed.

Under Drug Treatment, Moschcowitz places digitalis first. For many years digitalis was contra-indicated in hypertension because it was supposed to increase blood-pressure, and it was considered the heart stimulant *par excellence*. Today the conception of digitalis is that of a regulator and not of a stimulant. With this clearer understanding of the effects of digitalis, our timidity as regards its employment in hypertension has completely disappeared. Even when the pulse rhythm is regular and the pulse rate only moderately increased, if there are signs of cardiac insufficiency then digitalis is indicated irrespective of the degree of hypertension present. Digitalis is, of course, useless in cases of hypertension with a constantly slow pulse around 60; but a pulse of 74 or 80 need not be considered a contraindication for its use. Moschcowitz believes the nitrites only useful as symptomatic remedies; iodides he uses only in patients with hypertension with an old history of syphilis and who complain of headache. Chloral hydrate acts only as a sedative in reducing blood-pressure. Caffeine as an diuretic is eminently useful in the decompensated states of hypertension.

Corpus luteum has been employed in the treatment of climacteric hypertension and is favorably mentioned by Riesman<sup>159</sup> and by Hopkins.<sup>160</sup> The latter author also mentions the use of benzyl benzoate concerning the use of which in the treatment of hypertension there is surprisingly little comment in the literature. It is interesting to note that McCrae,<sup>161</sup> in his clinic on hypotension, refers to the value of corpus luteum or ovarian extract in the treatment of the cases of low blood-pressure which follow the menopause. He also suggests adrenalin and ergot in the treatment of hypotension. The general treatment advised in many respects resembles that suggested for hypertension.

**Mediastinal Affections.** Lemon<sup>162</sup> reminds us that in few parts of the body is there a greater number of important structures confined in so small an area than in the mediastinum. In the anterior mediastinum there are present the remains of the thymus or the thymus itself, lymph nodes and areolar tissue. The middle mediastinum contains the heart with its arterial and venous trunks, the trachea and bronchi, and the hilus of the lung on each side. In the posterior mediastinal space are found lymph nodes, the esophagus, the thoracic duct, and the vagus, phrenic and sympathetic nerves. As a result of this variety of structures, lesions in this region may produce a great variety of symptoms, but there is a certain group of symptoms common to most of the diseases affecting the mediastinum, that is, symptoms of pressure on its several structures. The following tabulation of these symptoms is copied from Lemon who amplified a summary used by Blair.

<sup>159</sup> Loc. cit. See reference, p. 155.

<sup>160</sup> New York Medical Journal, 1919, ex, 930.

<sup>161</sup> Medical Clinics of North America, 1920, iii, 1177.

<sup>162</sup> Ibid., 1919, iii, 635.

## COMMON PRESSURE SYMPTOMS AND SIGNS.

- |                                       |   |
|---------------------------------------|---|
| 1. Esophagus:                         | Dysphagia: (a) persistent when due to direct pressure.<br>(b) transient when due to irritation of the recurrent laryngeal nerve.  |
| 2. Trachea:                           | Brazen cough (gander cough).<br>Dyspnea—often only on exertion.<br>Stridor, with bellows breathing and indrawn manubrium sterni.<br>Bronchorrhea.<br>Hemoptysis.        |
| 3. Root of lung and pleura:           | Difficult and insufficient aëration like phthisis.<br>Pulmonary collapse, consolidation or chronic pneumonia.<br>May vary from time to time with variation in pressure. |
| 4. Nerve trunks:                      | Neuralgic type of pain, paroxysmal and intermittent.  |
| 5. Pulmonary artery:                  | Systolic murmur, dilated right heart.   |
| 6. Superior vena cava:                | Cyanosis—edema of head and neck and upper extremities.<br>Collaterals do not pulsate as in cardiac disease.   |
| 7. Right pulmonary veins:             | Hydrothorax and collapse of lung.   |
| 8. Thoracic duct:                     | Marasmus.   |
| 9. Cardiac plexus:                    | Anginal attacks simulating angina pectoris.<br>Third cervical to third dorsal segmental distribution.   |
| 10. Sympathetic nerves:               | Dilated pupils, indicating irritation.<br>Contracted pupils, indicating paralysis.<br>No loss of reflex except in lues.<br>Unilateral sweating, flushing or pallor.     |
| 11. Vagus nerves:                     | Dyspepsia, nausea, vomiting, dyspnea, hiccup.   |
| 12. Recurrent laryngeal nerves:       | Hoarseness, aphonia, spasm or paralysis of the left vocal cord—suffocation.   |
| 13. Right recurrent laryngeal nerves: | Right cord paralysis.   |
| 14. Phrenic nerves:                   | Unilateral paralysis of the diaphragm. Pain about the neck just above the clavicle.   |

Lemon then proceeds to the *differential diagnosis of the various affections of the mediastinum*. Under benign neoplasms, he mentions intrathoracic chondroma and dermoid cysts; two cases of this latter condition have been observed by W. J. Mayo which were diagnosed by the finding of bits of hair and teeth in the sputum. Staffieri<sup>162</sup> has recently reported a case of intrathoracic teratoma of which less than 100 cases are on record. In his patient there had been for a number of years recurring cough and blood-stained expectoration in which for two years the patient had often found hairs. At operation, a teratoma was found opening into a bronchus. Recovery followed the operation except for a small fistula. This is often the result and in fact Staffieri states that most of the reported cases were left with a fistula. The teratoma generally makes itself manifest during the period at puberty but have first been found at all ages. Operation should always be undertaken, as there is always danger of fatal compression from the growth, and in some non-operative cases the cyst underwent malignant degeneration.

Carcinoma and lymphosarcoma are the usual malignant neoplasms, lymphosarcoma being by far the more common. Metastasis from the lymphosarcoma is frequent and diagnosis is often arrived at by histologi-

<sup>162</sup> Revista Med. d. Rosario, 1919, ix, 255; Abs., in Journal of the American Medical Association.

cal examination of an enlarged gland removed from above the clavicle. In the case of primary sarcoma of the mediastinum reported by Street,<sup>163</sup> the tumor eventually involved also the left lung, trachea and right primary bronchus. In his case it is interesting to note the very typical symptomatic picture which was present. A positive Wassermann on two occasions seemed to suggest that the condition might be syphilitic, but at autopsy the sarcomatous nature of the lesion was undoubted.

Piazza-Martini<sup>164</sup> has reported 20 cases of mediastinal tumors in which the symptoms were unusual. In some, paroxysmal cough was the only symptom.

Hodgkin's disease involving the mediastinum can be differentiated readily according to Lemon and in his series in each case some factor made the diagnosis certain before the condition in the chest was analyzed. Sometimes it was a glandular enlargement elsewhere which afforded opportunity for microscopic examination, and sometimes it was the associated symptoms.

An interesting case of mediastinal Hodgkin's granuloma with perforation of the chest wall is reported by Lyon.<sup>165</sup> It was a case of neoplastic growth having the tissue characteristics of Hodgkin's granuloma and primarily situated in the mediastinum. Ewing reviewed the evidence on this case and considers it an example of thymoma belonging to the Hodgkin class. Lyon's summary of the case is as follows: "It occurred in a young adult white male of good previous and family histories. Its duration was sixteen months. The neoplastic mass caused pressure erosion of the chest wall; the right pleura became infected and a retropleural and retroperitoneal abscess developed, the patient dying of toxemia and exhaustion. The chief pathological findings were extension of the mediastinal neoplastic growth into the right lung, involvement of the bronchial and mediastinal lymph nodes, of many abdominal lymph nodes and of the retroperitoneal and inguinal nodes. Metastatic-like growths were found in the unenlarged spleen, in the tail of the pancreas, in the right kidney and in the epicardium and beginning to invade the myocardium. The liver and the cervical, maxillary and axillary lymph nodes were uninvolved."

According to Wessler and Greene,<sup>166</sup> a large percentage of cases of Hodgkin's disease have intrathoracic lymphomas which are demonstrable by the roentgen ray. In some cases the roentgenogram presents nothing characteristic, but in a considerable number a distinction from other forms of new growth or glandular enlargement can be made. When the process involves only the mediastinum, it is difficult or impossible to distinguish with the roentgen ray the picture from that presented by other mediastinal growths. When, however, there are also present discrete notes at the roots of the lungs and the shadows extend for a considerable distance from the roots of the lungs, then a differential

<sup>163</sup> Canadian Medical Association Journal, 1920, x, 362.

<sup>164</sup> Ann. di. clin. méd., 1919, ix, 136; Abs., Journal of the American Medical Association.

<sup>165</sup> American Journal of the Medical Sciences, 1919, clviii, 557.

<sup>166</sup> Journal of the American Medical Association, 1920, lxxiv, 445.



diagnosis may be ventured. Also, in Hodgkin's disease there is a frequent and unique enlargement of the right paratracheal group of nodes, which occurs only rarely in other diseases.

Lemon says but little concerning intrathoracic goiter. It may exist for years without symptoms although it usually manifests itself by dyspnea or hoarseness due to pressure on the trachea, bronchi, or the recurrent laryngeal nerve. Its diagnosis presented difficulty in only one case in his series. In children the roentgen-ray shadow of the thymus resembles that of the substernal goiter. Schwyzer<sup>167</sup> has recently written concerning the diagnosis and surgical treatment of intrathoracic goiter.

Syphilis may appear in the mediastinum either as gummatous involvement, or in the form of chronic syphilitic mediastinitis; gummata are less frequent in the mediastinum than in the lung, but gummata of the mediastinum may accompany syphilis of the lung. Lemon refers to such a case. Chronic syphilitic mediastinitis has been studied especially in children when it is due to inherited infection, but also occurs in adults from acquired syphilis. Castex and Beretervide<sup>168</sup> report what they consider a unique case of chronic mediastinitis from tardy syphilis in a man of twenty-eight years of age. It is interesting to note that in their case the compression of the vena cava dominated the clinical picture. This is not usually the case, for even when mediastinal gummata become very large they are characterized by few symptoms.

### DISEASES OF THE LUNGS AND PLEURA.

**Abscess of the Lungs.** In a recent article Wessler and Schwartz<sup>169</sup> analyze 15 cases of abscess of the lung in infants and children. Three of these cases followed aspiration of a foreign body; 5 were subsequent to tonsillectomy and 7 were attributed to pneumonia or other inflammatory lung condition.

An interesting point is emphasized concerning the location of the abscess. In those cases following operation the disease is usually seated in the upper lobes, while, on the other hand, abscesses resulting from the aspiration of foreign bodies and the chronic bronchopneumonia type of bronchiectasis usually localize in the lower lobes. The authors suggest that it is not improbable that the recumbent position during operation has some bearing on the upper lobe localization of these abscesses.

The course of the post-tonsillectomy case is quite characteristic and is worthy of note. "Immediately, or several days, after the operation, a distressing, persistent cough develops. This is especially harassing at night, but it may also be present throughout the day. With the cough there is usually a rise of temperature. This temperature is fairly constant during the first weeks, with minor fluctuations. Later it may become intermittent, and there may be entire absence of temperature

<sup>167</sup> Journal of the American Medical Association, 1920, lxxiv, 597.

<sup>168</sup> Prensa Med. Argentina, 1919, vi, 213; Abs., Journal of the American Medical Association.

<sup>169</sup> American Journal of Diseases of Children, 1920, xix, 137.

elevation for days. The physical signs of lung involvement are usually slight or absent during the early stages. Later, they may become definite, and the evidences of a cavity may be made out. This is in contra-distinction to the adult cases in which the physical signs, even of an extensive process and a large cavity, are usually indefinite.

On the thirteenth or fourteenth day, signs of gangrene are noted; including fetid breath, putrid sputum and hemoptysis. The sputum is then profuse. Club fingers appear very early and disappear after the abscess has healed, sometimes earlier.

During the course of the disease, complications such as perforation of the abscess into the pleura with a resulting empyema or pyopneumothorax, severe hemoptysis or cerebral abscess, may make their appearance."

Many of these cases heal spontaneously and this, if it is to occur, does so within two months. Those that do not heal may result in bronchiectasis or lead to death from various complications.

The authors in closing emphasize the importance of bronchoscopy in many cases. In children especially a history of the aspiration of a foreign body may not be obtained, and the roentgen-ray examination may not disclose the presence of a foreign body in the midst of the surrounding abscess shadow. Early removal of such a foreign body may lead to the prompt resolution of a lung abscess if it is not of too long-standing.

Wessler<sup>170</sup> has analyzed 100 cases of suppurative lung disease which were studied with the roentgen ray, and which etiologically were classified as follows:

Postoperative:		
(a) Posttonsillectomy . . . . .		21
(b) Other operations . . . . .		5
Postpneumonic . . . . .		37
Insidious (colds, grippe) . . . . .		21
Postempyema . . . . .		3
Aspiration:		
(a) Immersion . . . . .		2
(b) Coma (drug and alcoholic) . . . . .		2
Postnasal . . . . .		1
Tuberculosis . . . . .		2
Postesophagus (carcinoma) . . . . .		1
Actinomycotic . . . . .		1
Diabetic . . . . .		1
Syphilitic . . . . .		1
Foreign body . . . . .		2

He emphasizes that there is a distinct difference in the localization of abscesses following aspiration and those following pneumonia, as will be seen from the figures quoted from his article.

	Upper lobe.	Lower lobe.	Middle lobe.
Aspiration abscesses . . . . .	18	9	1
Non-aspiration abscesses . . . . .	24	44	3

From these it will be seen that upper lobe suppuration in aspiration abscesses is twice as common as involvement of the lower lobe, while in the other group of cases the conditions are just reversed.

<sup>170</sup> American Journal of Roentgenology, 1919, vi, 161.

In the case reported by Bevan<sup>171</sup> the pulmonary abscess developed after tonsillectomy, and was localized by the roentgen ray in the seventh intercostal space four inches to the right of the spinous process. Pus was not obtained at the first aspiration through the skin, but an incision was made down to the parietal pleura and then, upon introducing a very fine needle, pus was obtained. The parietal pleura was then pressed firmly against the visceral pleura by iodoform gauze packing in order to secure adhesions between the two pleural layers. Four days later it was found that firm adhesions had formed and it was then possible to drain the abscess without any danger of empyema. Bevan is an advocate of this two-stage operation, but admits that all of the cases do not proceed to an uneventful recovery. He emphasizes the grave danger of pulmonary or cerebral abscess which the apparently simple and supposedly safe operation of removal of the tonsils carries with it.

Green,<sup>172</sup> in reporting his operative experience with lung abscess, refers to 10 cases; one followed a postpneumonic empyema, two resulted from foreign bodies, one was complicated by an interlobar empyema, one was connected with an abscess of the liver, two were tuberculous and in three instances the etiology was in doubt. It is interesting to note that none of these cases were attributed to tonsillectomy.

Lilienthal's<sup>173</sup> case followed tonsillectomy and is especially of interest from the large number of hemorrhages which occurred and from the good result of radical surgery. The symptoms appeared about a week after a tonsillectomy under general anesthesia and the first hemorrhage occurred about six weeks after the onset of symptoms. Within a few weeks, fifteen hemorrhages occurred, some of which were quite copious. This symptom of lung abscess is worthy of emphasis as it is quite a constant happening, and yet abscess is not sufficiently considered as a cause of unexplained hemoptysis. Lilienthal extirpated the right lower, middle and part of the upper lobe with subsequent atrophy of the remaining part so that ultimately no lung was functioning in the right chest. Over a year later the patient was in excellent general condition and stated that he was able to dance through seventeen dances without undue effort and without shortness of breath. A recent roentgenogram revealed that the place of absent lung was taken by a closed pneumothorax. Sixteen cases of abscess are reported from the Mayo Clinic by Hedblom<sup>174</sup> and the etiological factors in these cases were as follows: Pneumonia (postoperative) 4 cases; teeth extraction, 3 cases; tonsillectomy under general anesthesia, 2 cases; gastroenterostomy for ulcer, 1 case; grippe and pneumonia following trauma each 1 case; questionable, 4 cases.

In discussing pulmonary suppuration, Hedblom<sup>175</sup> points out that abscess is a sequel of inflammation, or results from infection reaching the lung tissue by way of the bronchus, the blood stream, or by direct

<sup>171</sup> *Surgical Clinics of Chicago*, 1919, iii, 349.

<sup>172</sup> *Annals of Surgery*, 1919, lxx, 539.

<sup>173</sup> *Surgery, Gynecology and Obstetrics*, 1919, xxix, 443.

<sup>174</sup> *Minnesota Medicine*, 1919, ii, 337.

<sup>175</sup> *Medical Record*, 1919, xvi, 441.



extension. Persistent cough is the most characteristic symptom and many of these cases it is probable are mistaken for pulmonary tuberculosis. In one-third of the cases he reports there was a symptomatic picture which might well be thought to be suggestive of tuberculosis.

Carr<sup>176</sup> reports a typical case of pulmonary abscess following tonsillectomy. In this instance pain in the right side developed six days after the tonsillectomy which had been performed under gas and ether anesthesia. The operation preceded by ten days the usual fit of coughing with discharge of pus.

This subject is not a new one but is gone into thus fully with the idea of reminding ourselves of the frequency of this complication after operations on the throat and nose. No better summary of it could be given than that of Claytor<sup>177</sup> four years ago.

1. There is too great a tendency to jump to the conclusion that loss of weight and strength, accompanied by a hectic fever and free expectoration over a number of weeks or months, is due to tuberculosis. Such cases should be subjected to a thorough physical examination and to radiography, and a leukocyte as well as a sputum examination should be made.

2. Because a lesion is located near the apex of the lung is no positive evidence that it is tuberculosis.

3. Delay before resorting to surgery may be fatal.

4. The abscess may be long in manifesting itself after the primary infection has occurred.

5. Abscess of the lung as a result of operations on the nose and throat is not so very uncommon.

6. There is something wrong in the way these operations are done or in the way the anesthetic is given, or in both.

7. In view of the wholesale removal of tonsils as now practiced, there should be a more careful consideration of the possible dangers resulting from such operations and greater precautions should be taken to guard against them.

Claytor had observed 7 cases of pulmonary abscess of which 4 were directly traceable to an operation upon the nose and throat. In the same year 6 cases following tonsillectomy were reported by Manges.<sup>178</sup>

Bassim,<sup>179</sup> in 1913, could find only 19 cases of pulmonary complications following tonsillectomy or adenoidectomy mentioned in the literature, most of which were thought to be pneumonia. Tuffier gave him the records of two similar cases, one a bronchopneumonia complicated by a gangrenous pleurisy; the other a gangrenous bronchopneumonia with an encysted purulent pleurisy. It seems probable, from our knowledge today gained largely by the roentgen ray, that some of these cases considered pneumonia were in reality pulmonary abscess. From Bassim's references it appears that the literature on this subject does not go very far back nor is it very extensive.

<sup>176</sup> Medical Clinics of North America, 1919, iii, 209.

<sup>177</sup> International Clinics, 1916, 26th series, ii, 73.

<sup>178</sup> American Journal of Surgery, 1916, xxx, 78.

<sup>179</sup> Paris Thesis, 1913, No. 181.

Burger<sup>180</sup> concludes that his review of the literature concerning lung abscess following tonsillectomy confirms, (1) the necessity of keeping the patient in bed under medical supervision for a few days after tonsillectomy, (2) in older children the employment of local anesthesia, (3) in young children the need of all the special precautions which should be employed with every general anesthetic. He believes that with proper precautions this variety of lung abscess can be avoided.

It is interesting to note that he credits Manges, in 1916, with being the first to call attention to this subject.

Simpson and Noah<sup>181</sup> report 2 cases in which pulmonary abscess followed tonsillectomy under local anesthesia. Both patients were tuberculous but the postoperative complication seems to have not been related to the tuberculous process. The fact that the patients were adults and that no general anesthetic was employed made these cases of unusual interest. The writers argue from these cases that aspiration is not always the course by which the infection reaches the lung. Hematogenous embolism seems to them more likely.

So far, the frequency of pulmonary abscess after tonsillectomy has been emphasized, but, on the other hand, Scudder<sup>182</sup> in 1914 reported 16 cases, in none of which was operation on the nose or throat recognized as of etiological import, and we must not forget the other well-recognized causes of abscess of the lung.

Clerc, Ramond and Guillaume<sup>183</sup> report on the frequency of this complication after gassing. Much has been written about the pulmonary complications after gassing, but not much emphasis has been placed on the occurrence of abscess. Among 672 cases of gassing, the authors observed 75 with bronchial or pulmonary complication, and, of this number, 7 developed abscess of the lung. In only 2 instances did the abscess make its presence known within three weeks after the gassing, while in the other cases the onset varied from three weeks to six months. Some of the abscess collections were sufficiently large to simulate pleural effusion, and in fact the authors do not very clearly state how they were able to determine that it was abscess and not empyema with which they were dealing. The cases with abscess developing early after gassing were usually not recognized owing to the presence of extensive bronchopneumonia, and it was only at autopsy that the abscess was discovered. The later cases were diagnosed by roentgen ray or puncture, and in this group operation can be performed with a good chance of success.

The same slow development which is noted after tonsillectomy and after gassing is even more in evidence in some of the cases following foreign bodies. Creyx<sup>184</sup> reports a case of a soldier wounded in the chest in July, 1917. Healing of the wound took place after suppuration and the man was able to work; but he reëntered the hospital in May, 1918, after several months of failing health and strength, and was found to have an abscess of the lung.

<sup>180</sup> *Nederlandschr. Tijdschr. v. Geneesk.*, 1919, ii, 1359.

<sup>181</sup> *Pennsylvania Medical Journal*, 1920, xxiii, 322.

<sup>182</sup> *Boston Medical and Surgical Journal*, 1914, clxxi, 523.

<sup>183</sup> *Progrès Méd.*, 1919, xxxiv, 222.

<sup>184</sup> *Jour. Méd. Bordeaux*, 1919, xc, 3.

In the recurrent epidemic of influenza of 1919, Symmers<sup>185</sup> claims that intrapulmonary abscesses were much more frequent than in the epidemic of 1918. In the epidemic of 1918, he states that intrapulmonary abscesses were virtually unknown accompaniments of the pneumonic process, while in the recurrent epidemic they were encountered in 35.5 per cent. of all cases. The figure, of course, refers to autopsy findings only, and is based on 45 cases. The 16 which were associated with intrapulmonic abscess showed multiple abscesses in all but one case. In one case the upper lobe of the lung was almost completely replaced by multiple discrete or intercommunicating cavities.

## DIFFERENTIAL DIAGNOSIS

	Pulmonary abscess.	Bronchiectasis.	Pulmonary tuberculosis.
Clinical history	Following acute pulmonary infection; tonsillar and nasal operation; post-influenzal	Following pneumonia in childhood; bronchitis; slower to appear and less constant than abscess.	Longer history of illness; repeated attacks of toxemia; greater nutritional disturbance.
Nature of process	Microorganisms producing an acute infection; usually in lower lobes	Disease of the bronchi; follows fibrosis and contraction of pulmonary tissue; commonly near hilum	Chronic infection; usually first near apices.
Inspection	Diminution of motion on affected side	Diminution of motion on affected side	Similar diminution but more difficult to determine, as it is often bilateral.
Reflex changes in muscles and other soft tissues	Not marked	Not marked	Liable to be very marked.
Palpation and percussion	May be of little aid	May be of little aid	Far more important.
Auscultatory signs	Usually few and indefinite; few rales	Usually few and indefinite; few rales	Usually definite and with many rales.
Diagrammatic representation	See Fig. 3	See Fig. 4	See Fig. 5.

All who saw much autopsy material during the influenza epidemic of 1918 must have seen many instances of localized areas of softening which seemed to have reached a stage certain to have terminated in abscess had the patient lived. And also many instances were observed of actual abscess formation. That too high a percentage of those escaped prompt recognition is in all probability to be attributed in part to the fact that many of these collections formed in the deeper parts of the lung or in the upper lobe. Lippman<sup>186</sup> mentions 3 cases in which aspiration failed to locate a suspected abscess; in each of the 3 there was an upper lobe abscess and in each spontaneous evacuation occurred by the coughing up on a single occasion of large quantities of purulent material.

<sup>185</sup> Journal of the American Medical Association, 1920, lxxiv, 646.

<sup>186</sup> California State Medical Journal of Medicine, 1919, xvii, 41.



The frequency of influenza as a cause of abscess is stressed by Pottenger<sup>188</sup> who states that he has seen within the past year and a half more than 20 pulmonary abscesses which followed tonsil operations, but that the most common form of pulmonary abscess today is that which followed the recent influenza epidemic.

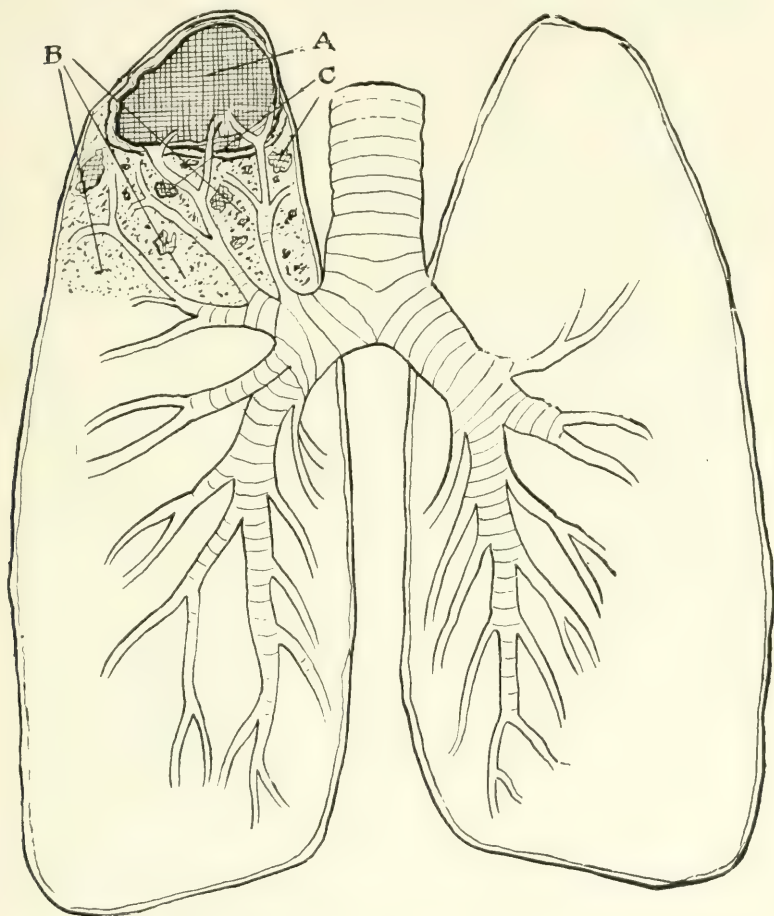


FIG. 3.—Diagrammatic illustration of a cavity due to pulmonary tuberculosis. The cavity, *A*, is surrounded by tissue which is the seat of tuberculous infiltration, *B*, and which contains many small cavities, *C*. These are ideal conditions for the production of rales.

Pottenger then discusses the differential diagnosis between pulmonary abscess, bronchiectasis and pulmonary tuberculosis. Although it is scarcely fair to such an excellent article, the reviewer has attempted, for convenience sake, to reduce Pottenger's differential points into tabular form (see page 94), which with Figs. 3, 4 and 5 gives a very good idea of this subject.

<sup>188</sup> American Journal of the Medical Sciences, 1919, clviii, 502.

**Foreign Bodies in the Air Passages.**—Just as in post tonsillectomy abscess of the lung, there is a considerable period of latency of symptoms after the transitory violent dyspnea which follows immediately on the aspiration of a foreign body into the air passages. Graham<sup>188</sup> points out that this period with few, if any, symptoms and later the gradual onset, and chronic character of the symptoms, might lead one to fail to suspect the presence of a foreign body. He believes that many cases

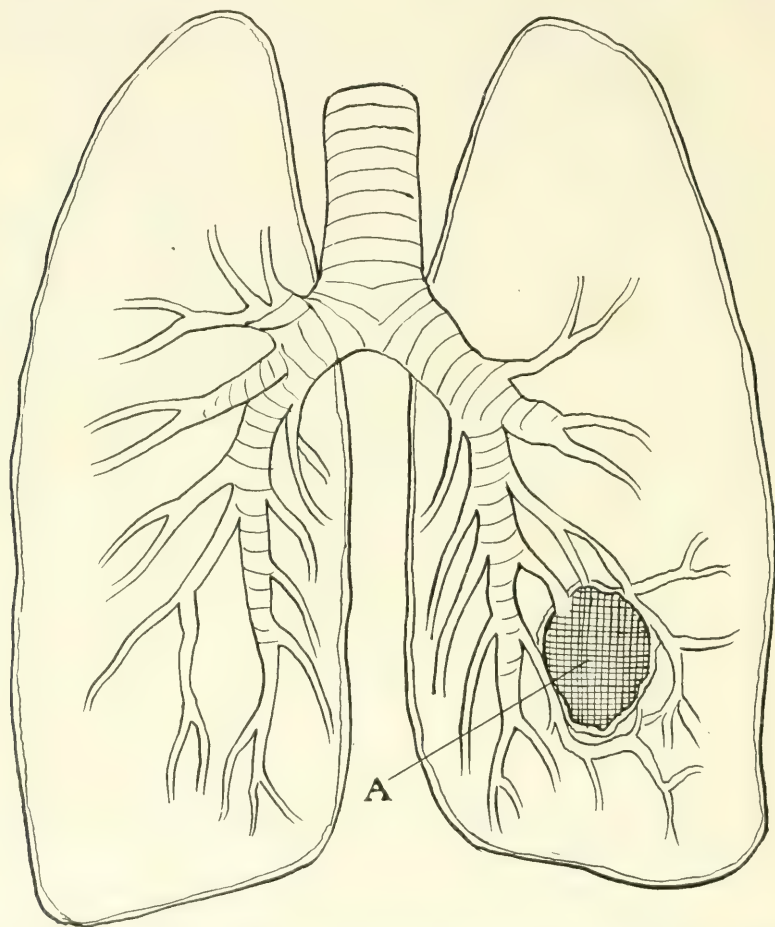


FIG. 4.—Diagrammatic illustration of acute pulmonary abscess. The abscess, A, is situated in the midst of and surrounded by healthy pulmonary tissue. The source of rales is the cavity itself and the bronchi leading from it. This condition is not favorable to the production of many rales.

are not recognized, and proceeds to point out certain of the reasons why this is so. The symptoms may vary greatly, and especially if the foreign body is a metallic object the symptoms may be slight and indefinite. The roentgen ray may fail to reveal the presence of the foreign

<sup>188</sup> American Journal of Diseases of Children, 1920, xix, 119.

body, and a negative examination does not exclude the possibility of a foreign body being present. So also the physical signs are variable, and may be so indefinite as to be of little help.

Graham believes that one should suspect a foreign body if the following conditions are present: An unexplained leukocytosis, localized symptoms in one lung that do not clear up under treatment, no tubercle bacilli in the sputum, and a gradual failure in weight and strength.

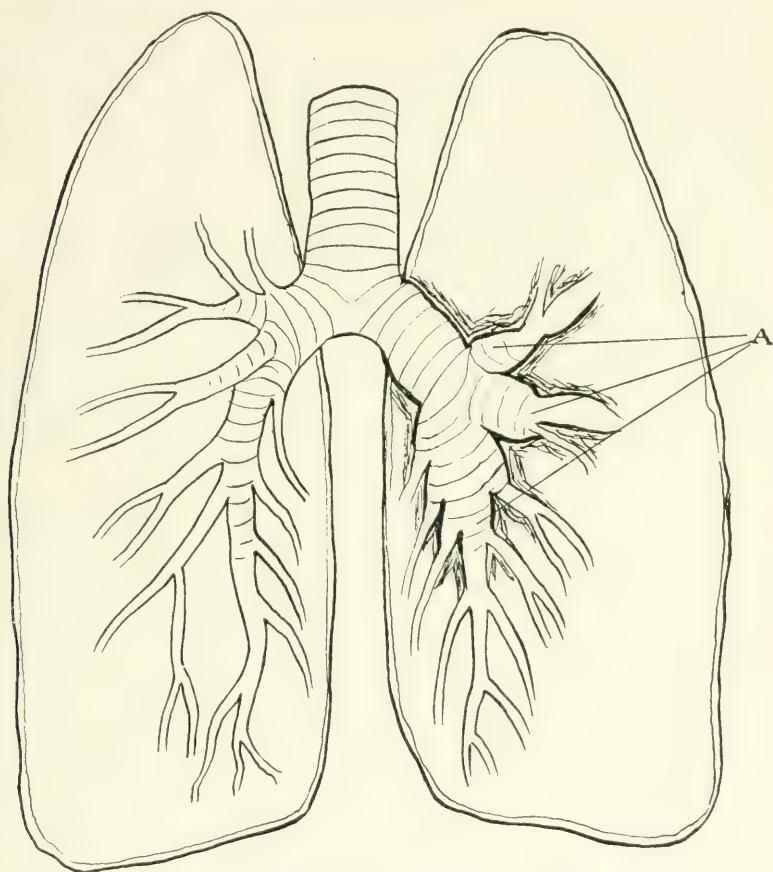


FIG. 5.—Diagrammatic illustration of bronchiectasis. The bronchiectatic dilations, *A*, are surrounded by pulmonary tissue which is not the seat of infection, consequently the main source of rales is the mucus which forms in the dilated bronchi. This condition is not favorable to the production of many rales

Treatment is by bronchoscopy and removal, and there seems little contra-indication to the passage of this instrument, although, of course, the results will vary with the skill of the operator.

In connection with this subject of the results of foreign bodies in the lung, it is interesting to note that food particles do not always seem to set up an inflammatory reaction. The reviewer remembers seeing,



through the courtesy of Dr. H. K. Pancoast, a roentgenogram of the lungs showing the presence of bismuth solution in the bronchial tree; the bismuth having been swallowed in the course of an examination in the fluoroscope for esophageal stricture. An opening had been present from the esophagus to the bronchus, and the bismuth had followed the course that food must frequently have taken in that patient, and entered the lung. No reaction could be determined, nor was the patient apparently conscious of the happening. A similar case is reported by van Wely<sup>189</sup> except that at autopsy the expected opening between the esophagus and the bronchus could not be found and it appeared that the ingested material meeting an obstruction in the esophagus was coughed up and, instead of being expelled, passed over into the air passages. The absence of any inflammatory reaction was noted in that case.

Foreign bodies may, of course, remain in the air passages without bringing about much, if any, serious reaction. Lemarchand<sup>190</sup> reports that a woman of fifty years of age retained in her bronchus for four years a cervical vertebra of a rabbit with no more serious symptoms than some cough, dyspnea and expectoration. After about four years the foreign body was coughed up, and within thirty-six hours all cough, dyspnea and expectoration had ceased. The bone is now in St. Bartholomew's Hospital museum. Other such cases are not so very uncommon, but the coughing up of the foreign body is uncommon, and one is not justified in waiting in inactivity for this spontaneous cure to take place.

Cases in which the foreign body has remained in the lung for long periods without being coughed up are common. Tyler,<sup>191</sup> in reporting a case in which a safety-pin remained in the lung for five years, reviews the literature briefly concerning such cases of long duration. The longest interval was twenty years and the next eleven.

McCrae<sup>192</sup> has had an opportunity to study a number of patients with foreign bodies in their bronchi, and in a recent article he discusses the physical signs associated with this condition. That these will be very variable can be readily understood when it is remembered that one foreign body may plug a bronchus completely while another may act as a ball valve. There may be much, or little, reaction about the foreign body, and such pus as is formed may be retained below the obstruction or may escape and spread into adjacent, or even distant, bronchi. As McCrae says, "Any set description fitting all cases is out of the question." Furthermore, the change in the signs from one examination to the next is very striking; sometimes this change is apparently due to change in position of the foreign body. Not uncommonly, signs are found over both lungs, and this is very likely to lead to serious diagnostic error.

<sup>189</sup> *Nederlandsch. Tijdschr. v. Geneesk.*, 1919, i, 2119; Abs., *Journal of the American Medical Association*, 1919, lxxiii, 1022.

<sup>190</sup> *Lancet*, 1919, ii, 646.

<sup>191</sup> *American Journal of Roentgenology*, 1919, vi, 456.

<sup>192</sup> *American Journal of the Medical Sciences*, 1920, clix, 313.

When the presence of a foreign body has not been recognized, one of two incorrect diagnoses is usually made. In the cases with an acute inflammatory process the diagnosis of pneumonia is the common mistake, while in the more chronic cases a diagnosis of pulmonary tuberculosis or bronchiectasis is the rule.

McCrae states that there is only one sign which was present in every patient seen by him and that is decreased expansion of the affected side. In fact, it may be the only sign present. It is interesting to note that in one such case where limited expansion was the only sign, that this sign wholly disappeared within three hours after the removal of a safety pin by Jackson, and the expansion became absolutely equal on the two sides. It is only fair to point out that limitation of expansion is also seen in the vast majority of cases of both pneumonia and chronic pulmonary tuberculosis. The second important sign is the occurrence of rales of a somewhat unusual character. Very careful listening is required to hear them, as they are very fine and soft; even more so than the early crackling rales heard in lobar pneumonia. These rales have only been heard over those cases in which a metallic foreign body was present, and McCrae compares them to the crackle made by very fine tissue paper.

Third, the so-called "Asmatoid wheeze." This term was coined by Jackson to describe a sign which he has now observed in over 50 cases. It was referred to in this article in 1919, and was originally reported in 1918.<sup>193</sup> It is elicited by placing the ear or the bell of the stethoscope close to the patient's mouth. It is similar to the wheezing sounds heard with bronchial asthma but differs in a minor degree difficult to describe. Apparently, it is directly referable to the foreign body, for it has been observed to disappear immediately after removal of the foreign body. All other signs are so variable that McCrae feels that no emphasis should be placed on any but the three mentioned above. In some cases the nature of the foreign body leads to a very acute general process which is fairly distinctive. In this group the so-called arachidic bronchitis or peanut bronchitis is the most important. This subject was discussed in last year's *PROGRESSIVE MEDICINE* but a further report by Jackson and Spencer<sup>194</sup> has appeared since then and it seems of sufficient interest and importance to quote their conclusions:

1. The aspiration of peanut kernels into the bronchi of children causes a definite syndrome which we term arachidic bronchitis.

2. There seems to be some inherent property in the peanut rendering it far more irritating than other forms of foreign body in the bronchi.

3. The instances which we have seen of this arachidic bronchitis have all been in children, and the younger the child the more severe was the reaction.

4. The pathologic condition consists of an edematous, purulent, laryngotracheobronchitis which, if not fatal, results in lung abscess.

5. The symptoms are due to (a) the swelling of the mucosa of the air passages, resulting in dyspnea and cyanosis, and (b) the accumulation

<sup>193</sup> American Journal of the Medical Sciences, 1918, clvi, 625.

<sup>194</sup> Journal of the American Medical Association, 1919, lxxiii, 672.

of the difficultly expelled purulent lung secretions, and the absorption of toxins therefrom, which results in fever and other signs of toxemia. The condition must be differentiated from laryngotracheal diphtheria and influenzal laryngotracheobronchitis.

6. The prognosis is grave if the peanut is not removed. The younger children succumb quickly to exhaustion and toxemia. If the peanut is promptly removed, convalescence is usually rapid. Resistance in the older children renders the course more protracted, but lung abscess ultimately results.

7. The treatment consists in early bronchoscopic removal of the peanut in the cases in which there is only slight dyspnea. In cases in which dyspnea is marked, tracheotomy may be required to pipe air to the lungs and to facilitate the removal of the viscid, purulent secretions, a bronchoscopic removal of the peanut through the mouth to be effected as soon as the wound has sufficiently granulated.

8. The number of the cases and the definiteness of the symptoms, together with the serious nature of the reaction, warrant the inclusion of arachidic bronchitis among the diseases affecting the lower respiratory tract of children.

**Interstitial or Subcutaneous Emphysema.** Prior to the recent epidemic of respiratory disease, this subject was not attracting much attention, but within the past year a number of articles have appeared. These emphasize the occurrence of this condition as a complication of influenzal pneumonia. That it is never, however, a very common finding is evidenced by the rather small number of cases reported by observers who had opportunities to see large numbers of cases of influenza pneumonia. In a recent article by Meyer and Lucke<sup>195</sup> the authors quote Symmers as having recorded 3 cases, Berkley and Coffen 11 cases; Clark and Synott 12 cases, while they themselves report on 7 cases which they were able to study out of a total of 9 observed. These 7 cases of subcutaneous emphysema were the only ones occurring in about 3000 cases of influenzal pneumonia. This makes an incidence of 0.3 per cent. in influenza with pneumonia and in the entire series of 12,000 cases of influenza only 0.07 per cent.

Meyer and Lucke point out the following features which were constant in the cases they observed. The onset of the subcutaneous emphysema was apparently sudden but occurred at a varying period of the disease. As a rule, however, the emphysema appeared only after the pneumonic process was well advanced. This is of interest in that the severe paroxysmal cough, to which the emphysema has been attributed, occurs early in the picture of influenzal pneumonia and is apt to be definitely less marked after the pneumonia is well established. Once the emphysema has appeared, its further spread is relatively slow; the greatest extent being reached in twenty-four to forty-eight hours. As a rule there were no symptoms associated with the development of the subcutaneous emphysema and the patient was generally unaware of its presence. There was no change in the temperature, pulse or respiration.

<sup>195</sup> American Journal of the Medical Sciences, 1920, clix, 417.



In their cases the emphysema most frequently appeared first in the region of the neck, but the supraclavicular spaces, neck, chest, face, extremities, abdomen and scrotum were in different cases involved. The skin over the emphysema showed no inflammatory reaction nor was there any systemic evidence of an added infection. In all of the patients the emphysema subsided considerably as the disease progressed, and a fatal outcome, which occurred in 4 of the 7 cases, did not seem to be the result of the development of the emphysema. At necropsy, the usual findings in influenzal pneumonia were discovered, and in 2 of the bodies there was not only subcutaneous emphysema but also air in the mediastinal tissue. In none of the 4 cases were any air bladders or pearl-like distended air-vesicles seen, nor did a careful search reveal any point of possible rupture. Meyer and Lucke point out the older theories all explain the occurrence of subcutaneous emphysema of this type as being due to purely mechanical causes resulting in the rupture of distended emphysematous air-vesicles. The infrequency of pneumothorax in such cases is a strong argument against this method of production, although, as Berkley and Coffen<sup>196</sup> argue, the subcutaneous emphysema may occur through the intrapleural route providing that adhesions exist between the two layers of pleura at the point of rupture. The second possible course is through the extrapleural route if the air dissects its way to the hilum of the lung.

Meyer and Lucke disagree with the older theories and advance their belief that the air escapes from a bronchus as a result of an ulcerative bronchitis. The air enters the loose peribronchial tissues and by dissecting along lines of least resistance gains the mediastinum and thence along fascial planes to the subcutaneous tissues. In this way the closed pleural sacs are not involved and the infrequency of pneumothorax is accounted for. In two of their postmortem examinations the subcutaneous emphysema was found more pronounced on the left side and on that same side an ulcerative bronchitis was present, and microscopic examination of the peribronchial tissues revealed a marked distention with air. The arguments presented by these authors are most convincing and suggestive.

A case which would fit in well with their theory was reported by Garrett.<sup>197</sup> A child, aged four years, recovered from what was thought to have been influenza. A cough, however, persisted and a few days later a widespread subcutaneous emphysema developed which, within a few hours, involved at first the trunk, neck, and eyelids, then the arms, thighs and scrotum. Death occurred on the same day. At postmortem the air was found in the subcutaneous tissues, in the mediastinal tissues and in the left pleura. A perforation of the left bronchus about one-sixteenth of an inch in diameter was discovered just beyond the bifurcation of the trachea. This was "apparently connected with what seemed to be a suppurating lymphatic gland; and through this, no doubt, the air was forced by the movements of respiration." In this instance there

<sup>196</sup> *Journal of the American Medical Association*, 1919, lxxii, 535.

<sup>197</sup> *British Medical Journal*, 1918, ii, 686.

can be apparently little doubt as to the origin of the emphysema and it is worth while noting that there was a pneumothorax on one side.

On the other hand, the 2 cases reported by Aich<sup>198</sup> both developed during the existence of severe cough; in one at least, "during a fit of coughing at night, his neck began to swell." This of course is scarcely an argument against the claim of Meyer and Lucke for cough would favor the passage of air through an ulcerated bronchial wall just as truly as it would favor the rupture of an emphysematous bleb.

Myquist and Ross<sup>199</sup> report a series of 13 cases of subcutaneous emphysema developing as a complication of influenzal pneumonia. In no instance was there a pneumothorax, nor were they able to discover a rupture of the lung surface. In one instance there was a recent scar of the visceral pleura but air could not be pressed through it. These authors raise the question as to the emphysema being due to a gas-producing bacterial infection. In 4 cases they obtained a gas-producing bacillus on culture after death from the heart's blood and emphysematous tissue. It is, of course, impossible to ignore these findings and it is of interest that 5 of the cases developed within a period of three days in one building, 4 of the 5 being in one ward, and 3 of them side by side. In the remaining 8 cases no evidence of contact could be traced. In 3 cases the emphysema was of the same non-inflammatory appearance as that observed by others, as, for example, Meyer and Lucke, who failed to find any gas-producing organisms in any case.

Still a different picture was observed at the Iowa State University where there occurred 33 fatalities among about 1100 cases of influenza. Twenty of those came to necropsy and one of the most striking and constantly present postmortem findings was a marked vesicular and interstitial emphysema. The interstitial emphysema involved mainly the anterior and posterior mediastinum, the layers of the pericardium and pericardial fat, the retroperitoneal and especially the perirenal tissues. There was no evidence of inflammation and no organisms could be demonstrated. No mention is made of subcutaneous emphysema. This description is taken from an article by Kelman<sup>200</sup> reporting the results of attempts to reproduce experimentally in animals the essential conditions obtained in the influenza with the object, among others, of determining, if possible, the route by which the air reached the mediastinal and retroperitoneal tissues. Experiments were carried out chiefly on rabbits.

Mechanical emphysema of the lungs was produced by pumping air into the lungs under varying pressures. In other experiments respiratory distress was produced by anaphylactic reactions, and in still others a broth culture, or the filtrate of broth culture, of *Bacillus influenza* was injected. As a result of each of these procedures, both vesicular and interstitial emphysema was produced. Kelman concludes from the clinical observations and the experimental results that the path taken by air escaping from the lung into the tissues is by way of the root,

<sup>198</sup> Indian Medical Gazette, 1919, liv, 418.

<sup>199</sup> Medical Record, 1919, xcvi, 353.

<sup>200</sup> Archives of Internal Medicine, 1919, xxiv, 332.

following the reflexion of the pleura and pericardium along the great vessels. This undoubtedly was the route followed by the air in her experimental results, but one is not entirely convinced that the experiments, as detailed in the paper justify the conclusion that this is the route followed in the development of tissue emphysema in clinical cases of influenzal pneumonia. Although in the clinical cases the vesicular emphysema was mainly marginal, large emphysematous bullæ were quite frequently observed subpleurally, and in many cases superficial distended air vesicles had ruptured and allowed an escape of air subpleurally. Nor does the hypothesis which is presented seem probable in view of other knowledge. Kelman suggests the hypothesis that the toxin of the infecting organism exerts an irritating influence on the respiratory center, inducing a dyspnea and cyanosis. Dyspnea is sufficient to produce emphysema. Emphysema thus produced in its turn increases the dyspnea and cyanosis. The above factors acting on alveoli weakened by the toxic action of the virus on the lung parenchyma, produce the acute vesicular emphysema observed in postinfluenzal bronchopneumonia.

Finally, mention should be made of a case report by Prym.<sup>201</sup> The report concerns the sudden death of a fifty-three-year-old man, who was apparently doing satisfactorily, with a right-sided croupous pneumonia. At autopsy, some vesicular emphysema was found, and a complete right pneumothorax, the development of which had been the cause of the sudden death. No interstitial emphysema was discoverable. Although no opening from the lung into the pleura, the author considers that there had been a rupture of some emphysematous bleb and he compares it with other cases of so-called spontaneous pneumothorax which are explained on this basis.

**Miscellaneous Pulmonary Conditions.** ACTINOMYCOSIS OF THE LUNGS. This condition is so seldom reported from the United States, although not very uncommon in Europe, that the one article appearing in the past year's literature would seem to deserve mention. Pulmonary actinomycosis is usually mistaken for tuberculosis, empyema or caries of a rib; for tuberculosis in the early stages and for empyema or caries of a rib later after the lesion has progressed toward the surface of the chest or even has pointed in an intercostal space. The history often fails to record the occurrence of a cutaneous lesion to which the pulmonary lesion is secondary, or the pulmonary involvement may be primary. One or both lungs may be involved. In the cases reported by Moll van Charante<sup>202</sup> the diagnosis was made in one by the finding of actinomycetes in the sputum while in the second the characteristic findings in the pus from the thoracic wall revealed the nature of the process.

In one case the general picture suggested tuberculosis, but there was tenderness in an intercostal space in the left interscapular region and in the neighborhood the percussion note was dull, voice sound transmission was reduced, and rales were present. A periostitis of the ribs was the roentgen-ray diagnosis, but sputum examination revealed the true

<sup>201</sup> München. med. Wehnschr., 1919, lxvi, 1089.

<sup>202</sup> Nederlandsch. Tijdschr. v. Geneeskunde, 1919, ii, 1150.



diagnosis. Autopsy also confirmed the diagnosis of actinomycosis, characteristic nodules being found throughout the lungs and the periosteum of the ribs being lifted up to form sac-like pouches.

The second patient complained for three months of pain in the left side of the chest. At length a hard swelling appeared over a rib at the painful area and a diagnosis of tuberculosis of the rib was made. The swelling softened, was incised, and actinomyces were found in the pus.

It is very important to remember that empyema is not the rule even in those cases in which the pulmonary lesion works its way to the surface and ruptures externally or is incised. This absence of involvement of the general pleural cavity results from the extensive adhesions which form between the pleural layers in advance of the actinomycotic process. This is an important aid in diagnosis, but, of course, final diagnosis rests upon the finding of the so-called "sulphur granules" in the pus or sputum or of the fungus itself, the streptothrix actinomyces.

An obscure clinical case of generalized infection with a fusospirillary organism, which in some respects resembled the fungus of actinomycosis, is reported by Mellon.<sup>203</sup> The patient, a boy of sixteen years of age, failed to convalesce satisfactorily from an operation for appendiceal abscess. The wound healed, but fever continued. Six months later the temperature showed a daily afternoon rise to 103° to 105°, there was pus in the urine, a leukocytosis of 20,000 and severe bronchial catarrh. A lung puncture obtained serum and flaky material. A little later, operation revealed a renal abscess, with almost complete destruction of the kidney. The remaining tissue showed a histopathology which was suggestive of the actinomycotic lesion, but which lacked the characteristic colonies. A week before the patient's death, eight months later, multiple pleural sinuses from both pleural cavities developed. During this long course the patient is said to have experienced half a dozen clinical cures, and for weeks at a time to have had no fever and to have gained in weight and strength.

PRIMARY ECHINOCOCCUS DISEASE OF THE LUNG is another condition which is but rarely seen in this country and which would certainly cause diagnostic difficulties. In the case reported by Fagioli<sup>204</sup> the diagnosis was only made with the roentgen ray, as the serum reaction had been negative and there was no eosinophilia.

THE LUNGS IN MALARIA. In Falconer's<sup>205</sup> article on this subject he states:

"The question whether a pure malarial infection is capable of producing the symptoms and physical signs of bronchitis, pulmonary congestion, and consolidation has been discussed for many years."

The author observed a group of cases in the British Salonika Force in 1916, and with British troops in the Balkans in 1917 and 1918. The pulmonary manifestations which were observed were as follows:

<sup>203</sup> *Journal of Bacteriology*, 1919, iv, 505.

<sup>204</sup> *Riforma Med.*, 919, xxxv, 498.

<sup>205</sup> *Quarterly Journal of Medicine*, 1919, xiii, 25.

I. Bronchitic. This is by far the most common pulmonary manifestation in malaria. The chest signs were those of ordinary bronchitis but showed a remarkable tendency to vary within a few hours and flit about from one part of the lung to the other. The temperature charts were very variable. In the blood either the benign or malignant tertian parasite was readily demonstrated. Untreated with quinine, the physical signs in the lungs persisted for days but when adequately treated the rapidity with which the signs disappear is dramatic.

II. Pleuro-pulmonary congestion with more or less definite evidence of consolidation.

These cases were not uncommon and some correspond to the cases of apical consolidation described by Brun and Crespín and Mailfort and to the third group of Armand-Delille, Paioseau, Abrami, and Lemaire. The involvement may, however, occur in any part of the lung and may be present at an apex or base one day and gone the next, possibly to appear in some other part of the lung. Many of the patients do not appear ill, especially in the apyrexial intervals. The physical examination reveals the usual signs of a not very extensive pneumonic consolidation. The sputum has not the typical tenacious rusty character and there is no leukocytosis. The pyrexial periods do not correspond with the appearance of new areas of involvement, but during their height there is usually development of respiratory distress which decreases or disappears during the apyrexial interval. Adequate quinine treatment has a very marked effect on the condition and most of the cases do well.

III. Massive collapse of the lung.

Not a very uncommon occurrence in malaria, but is generally overlooked or described as pneumonia.

IV. Concurrent malaria and pneumonia.

True pneumococcus pneumonia is not an uncommon event in malaria. The picture is little influenced by the malarial infection and in part the parasites often disappear from the blood when the lung symptoms appear. Quinine treatment has no influence once the pneumonia is established.

V. Pneumonia occurring in the course of chronic malaria without evidence of active malaria.

Apparently not a very important group.

VI. Dry pleurisy, or pleurisy with serous or hemorrhagic effusion.

Dry pleurisy is not uncommon in apparently uncomplicated malaria and Falconer has on three occasions found a hemorrhagic effusion which in each instance was sterile.

The author's conclusions are worth quoting verbatim. That although malaria is frequently complicated by pneumococcal infection, numerous cases occur in which there are notable changes in the lungs without any evidence of superadded infection. These may present the physical signs of bronchitis, pulmonary congestion with more or less definite evidence of consolidation, or massive collapse of the lung. In many cases the symptoms at first are almost entirely pulmonary and the malaria infection may be entirely overlooked. Its recognition at the earliest possible moment is important, as untreated with quinine there

is a great liability for the lung to become secondarily infected, with the development of true inflammatory changes.

That malaria may produce a pleurisy is the belief of Cordier.<sup>206</sup> He describes 4 cases illustrating the different pictures which may result clinically. The first patient at the height of a very severe malarial attack developed the signs of a peritonitis from perforation. Pain over the splenic region was intense, and dyspnea was quite marked. Ascites rapidly developed and puncture was resorted to on two occasions with the withdrawal of a pinkish fluid. Shortly after the development of the ascites, a left pleural effusion appeared, reaching a considerable extent within forty-eight hours. This also was aspirated, and a pinkish fluid resembling that obtained from the abdomen was withdrawn. Both the peritoneal and the pleural fluids showed many red blood cells and a markedly high percentage of mononuclear elements. The fluids contained no malarial plasmodia and no bacteria. The patient made a gradual recovery without further complication. A second case is recorded in which a rapidly-forming left pleural effusion appeared during a period of paroxysms of malaria. In this case, also, the pleural fluid was bloody, and showed an excess of mononuclear cells. In no case was Cordier able to demonstrate the plasmodia in the effusions, although they were numerous in the circulating blood. The author discusses the various possible explanations, as, for example, coincident infections, cardiac weakness, fixation of the left diaphragm as a result of splenic pain or enlargement, but he concludes that the picture cannot adequately be explained except by a true malarial pleurisy, the result of direct action of the plasmodia upon the serous surfaces of the pleura and peritoneum.

**PULMONARY DISEASE DUE TO ASCARIS LUMBRICOIDES.** Since it has become known, through the recent investigations of F. H. Stewart,<sup>207</sup> that the larvæ of *Ascaris*, after hatching in the intestines, migrate to the lungs this fact has been welcomed as explaining a few hitherto uncorrelated facts. The observations were, of course, made experimentally on animals, but there is every reason to believe that the behavior is the same in man. Stewart's findings have been confirmed by Yoshida and by Foster and Ransom. There is some little difference of opinion as to the course pursued by the *Ascaris* on its way from the intestine to the lung. It is probable that the larvæ bore through the wall of the intestine and enter the abdominal cavity. Yoshida<sup>208</sup> believes they pierce the diaphragm and pass into the lung through the pleural cavity. At this stage, the larvæ measure about 2 mm. in length. They migrate to the pharynx after a variable stay in the lung and pass down the alimentary canal. The route described by Ransom<sup>209</sup> is by way of the hepatic veins, inferior vena cava, heart and pulmonary arteries. As Ransom says, the fact that *Ascaris* in the course of its development regularly passes through the liver and lungs raises the question as to the damage it may do during its migrations.

<sup>206</sup> *Ann. de Méd.*, 1919, vi, 89.

<sup>207</sup> *British Medical Journal*, 1916, ii, 5, 474, 486, 753 and 1919, i, 102.

<sup>208</sup> *Journal of Parasitology*, 1919, vi, 19.

<sup>209</sup> *Journal of the American Medical Association*, 1919, lxxiii, 1210.



Under experimental conditions, it has been found that the larvæ may seriously injure the lungs, and the symptoms of a disease known as "thumps," which is highly destructive to young pigs, are similar to those shown by pigs suffering from *Ascaris pneumonia*. It is almost certain that this *Ascaris pneumonia* is responsible for much of the loss of life and stunting of growth that occur among young pigs. Ransom properly suggests that, by analogy, it is reasonable to suppose that *Ascaris* may occasionally, if not frequently, be involved in the production of pulmonary disease among human beings, especially young children. There are on record 2 instances of the feeding of *Ascaris* eggs to humans. These are quoted by Ransom. In the first a German physician, named Mosler, fed the eggs to healthy children. No evidence of infestation could be later obtained, but, a few days after the eggs were given, the children suffered from fever and difficulty in breathing. The other experiment was carried out by Lutz in 1888 on an adult volunteer. Soon after the ingestion of the eggs, an unusually severe bronchitis developed. In this case anthelmintic treatment later removed some thirty-five immature worms. In both these cases the respiratory symptoms may well have been due to the migration through the lungs of the *Ascaris* larvæ. It is to be expected that clinical observations will soon confirm this hypothesis. The lesion to be expected is a bronchopneumonia, or a severe bronchitis, probably in a child and associated with the finding of adult or immature *Ascaris* in the feces. Whether a chronic form due to repeated irritation will be observed is beyond conjecture.

It is worthy of note, however, that Crowell,<sup>210</sup> in his paper on the dangers of ascariasis, reports no case of pulmonary involvement or of adult *Ascaris* in the bronchi or lung, although he mentions their occurrence in the intestine, liver, pancreas, stomach, nasal sinuses, lacrimal duct, larynx, trachea and even in the middle ear.

**Certain Reports of Anatomical Interest.** CONGENITAL ABSENCE OF ONE LUNG. Only 21 previously reported cases could be collected from the literature by Levy<sup>211</sup> to whom fell the opportunity of reporting the first of such cases to be discovered in almost 6000 autopsies performed in the pathological department of the Johns Hopkins Hospital. The post-mortem finding was unexpected, as signs of bronchopneumonia had been noted before death on both sides of the chest, an observation probably to be explained by the tremendous size of the right lung which not only filled the right pleural cavity but extended over the front of the mediastinum and into the anterior part of the left hemithorax. The left lung was wholly absent, as were also the left bronchus, left pulmonary artery and left pulmonary vein.

In 15 of the 22 reported cases, it has been the left lung which was absent. This abnormality has been found eleven times in males and five times in females, the sex not being mentioned in the other six cases. Life is not incompatible with one lung; 12 of the cases died before the age of one year, the other 10 cases died at the following ages: 1 case at eight years, 1 case at eleven years, 1 at twelve years, 1 at twenty years,

<sup>210</sup> American Journal of the Medical Sciences, 1920, clix, 380.

<sup>211</sup> Ibid., 237.

3 at twenty-four years, 1 at fifty years, 1 at seventy years, and 1 is described as a young man. Few of these individuals had had respiratory symptoms, and the condition has never been diagnosed during life and verified at autopsy. Levy does not accept the case reported by Chiladiti in which the diagnosis was made from a roentgen-ray plate and not confirmed. Levy's case is the first in which asymmetry of the thorax was noted, the other cases all having symmetrical chests where any mention of the thorax was made. This may be explained by the frequency with which the absent lung has been replaced by a large pericardial sac, by fluid, or at least in part by the other lung which has undergone compensatory hypertrophy.

A somewhat similar case is reported by Jarisch.<sup>212</sup> A soldier, aged twenty-nine, had performed his duties apparently without difficulty for some years. He died of influenzal pneumonia and at autopsy a complete absence of the left lung, its vessels and the branch of the vagus was discovered. A small portion of the left bronchus was present. The left side of the chest was filled by the heart and by a projection of the right lung with some fatty tissue. There was only a slight degree of emphysema, the enlargement of the right lung being due to actual increased formation of lung tissue. There was only a faint indication of the fissure between the middle and lower lobe.

CONGENITAL ABSENCE OF BOTH CLAVICLES in a boy aged six years is reported by Stern.<sup>213</sup> In the patient's family there are 7 males, all of whom present this same congenital deformity, and 4 females, none of whom are afflicted.

Cervical ribs have been discussed in the past year by several writers without, however, adding anything to our knowledge of the subject. Church,<sup>214</sup> writing on the neurology of cervical ribs, reviews the literature and reminds us of the very varied pictures which may result from this anomaly. Neuralgic pains in the upper extremities are frequent, and there may be various paresthesias and even a dissociation of sensation in the affected arm similar to that found in syringomyelia. Weakness is very common and all varieties of claw hand may be encountered. Atrophy of the small muscles of the hand or forearm is not uncommon, and trophic disturbances of the skin, especially at the finger ends, including blebs, glossy skin, changes in the nails and hemorrhages under the nails, may also occur. Quite a number of cases diagnosed as Raynaud's disease have been found not to be due to the vascular disorder of symmetrical gangrene, but to have been caused by the vascular and neuritic changes secondary to cervical ribs.

That the symptomatic results of cervical ribs may not appear until middle age is reached is well illustrated by the cases reported by Du Bois.<sup>215</sup> Two of his patients were men of thirty-nine and sixty; in the former, symptoms had been present for six months, while the elder man had suffered since the age of forty.

<sup>212</sup> Wien. klin. Wehnschr., 1919, xxxii, 736.

<sup>213</sup> Journal of the American Medical Association, 1919, lxxiii, 1526.

<sup>214</sup> Ibid., 1919, lxxiii, 1.

<sup>215</sup> Arch. Méd. Belges, 1919, lxxii, 40.

It must not be forgotten that occasionally the same group of symptoms which is becoming increasingly familiar to us as a result of cervical ribs, may be produced by apparently normal first ribs. Stopford and Telford<sup>216</sup> have seen 10 such cases in two years and they properly point out that such cases have in all probability been frequently misdiagnosed because roentgen-ray examinations failed to disclose a cervical rib. They also point out that although women are no more prone to have cervical ribs, yet they are more likely to develop symptoms as a result of the anomaly than are men. Why this is the case is not known, nor why it is that symptoms may not develop until middle life although the cervical rib has been present from birth.

**Tuberculosis.** ETIOLOGY. Brown, Petroff and Pasquera<sup>217</sup> attempted to discover whether infection in guinea-pigs would follow exposure to what many have referred to as sufficient for infection of man. Their experiments were numerous and were carefully performed. For example, in studying the question of infection from dust, the specimens were collected from the room occupied by a patient with numerous tubercle bacilli in the sputum and a cough so explosive that the mouth was rarely covered, as well as from other rooms in the sanatorium. The dust was collected on sterile swabs. These were washed in sterile broth, the washings treated with normal sodium hydroxide, incubated for one-half hour, then neutralized with normal hydrochloric acid, centrifugalized, and the sediment divided into three portions. Of these portions, one was stained for tubercle bacilli; these were all negative, another was inoculated into gentian violet mediums but, as these were always contaminated, this method of study was abandoned. The third portion was inoculated subcutaneously in the inguinal region into guinea-pigs. In all, twenty-four animals were used with wholly negative results. Attempts to infect guinea-pigs by inhalation of dust were equally unsuccessful. Similar studies were carried out of the danger from telephone receivers, from properly cleaned eating utensils, from infected hands through handshaking, or from knobs of doors, and the danger of transmission by infected flies. In this investigation with guinea-pigs, no such danger of infection could be demonstrated. On the other hand, experiments to determine the danger of transmission of tubercle bacilli by kissing, or by the transference of the tubercle bacilli to eating utensils and thence, if not cleansed, to a second person, were quite conclusive and suggest that these methods may be of importance in the spread of the disease.

The *influence of trauma of the chest on the development of tuberculosis* is discussed by Tecon.<sup>218</sup> In 15 cases of contusion of the chest, proved pulmonary tuberculosis developed in 7, while in 2 additional instances there were clinical and roentgen-ray evidence of tuberculosis, but no bacilli were found. This incidence is higher than that reported by other observers. For example, Sergeant<sup>219</sup> found 5 of 9 cases, and Bernard and

<sup>216</sup> British Journal of Surgery, 1919, vii, 168.

<sup>217</sup> Journal of the American Medical Association, 1919, lxxiii, 1576.

<sup>218</sup> Rev. Méd. d. l. Suisse Rom., 1919, xxxix, 409.

<sup>219</sup> Bull. et mém. d. l. Soc. méd. d. Hôp. d. Paris, 1916, xl, 1048.



Mantoux,<sup>220</sup> in 49 cases of thoracic contusion, report 3 proved instances of tuberculosis and a number of others in which the symptoms were most suggestive. It is interesting to note that a contusion seems to be a more frequent precursor of tuberculosis than does an actual wound of the chest. Tecon also found a very low percentage of tuberculosis following exposure to war gases.

Tissue injury elsewhere than in the lung has been recognized as an important factor in the development of local tuberculosis. Gammons<sup>221</sup> reports 4 such cases. All had a pulmonary tuberculosis, and in each a local tuberculosis; in 2 of the knee, in the third case in the vicinity of the right ilium and in the right ankle, and the fourth in the small bones of the hand, developed after an injury limited to the part later affected.

EFFECTS OF INFLUENZA ON PULMONARY TUBERCULOSIS. Many articles have appeared during the past two years concerning this subject, emphasizing the old and familiar experience that influenza may stir latent tuberculosis into activity or favor the extension of already active disease. It is undesirable to abstract all these articles, but a summary of their figures may be of interest. The reports are of two types; in some the figures refer merely to a certain group of tuberculous patients who developed influenza; in others the incidence of influenza in a larger group of tuberculous patients is given. Where two sets of figures are quoted for a single observer they refer to the first and second epidemics.

Author.	Tuberculous patients.	Number developing influenza.	Deaths.	Number showing aggravation of tuberculosis.
Permin <sup>222</sup>	30	30	1	13
Wurtzen <sup>223</sup>	180	97	10	35 of 48
Creischer <sup>224</sup>	200	29	2	0
Von Hayek <sup>225</sup>	215	67	1	Severe complication only in proliferative type of tuberculosis.
	215	11		
Bochalli <sup>226</sup>	100	10		
	150	21	4	6
Meyer <sup>227</sup>	274	54	6	7
	(61 not patients)			
Deusch <sup>228</sup>	35	35	0	7
Ménard <sup>229</sup>	41	41	18	9
Stivelman <sup>230</sup>	...	24%	11.4%	2
Berghoff <sup>231</sup>	30	17	4	6

<sup>220</sup> Bull. et mém. d. l. Soc. méd. d. Hôp. d. Paris, 1917, xli, 683.

<sup>221</sup> Boston Medical and Surgical Journal, 1920, clxxxii, 119.

<sup>222</sup> Ugesk. f. Laeger, 1918, lxxx, 1739.

<sup>223</sup> Ibid., 1919, lxxxi, 673.

<sup>224</sup> Deutsch. med. Wehnschr., 1919, xlv, 323.

<sup>225</sup> Wien. klin. Wehnschr., 1919, xxxii, 196.

<sup>226</sup> München. med. Wehnschr., 1919, lxi, 330.

<sup>227</sup> Medical Record, 1919, xcv, 592.

<sup>228</sup> München. med. Wehnschr., 1919, lxi, 464.

<sup>229</sup> Bull. et mém. Soc. méd. d. hôp. de Paris, 1919, xliii, 101.

<sup>230</sup> New York Medical Journal, 1919, cx, 20.

<sup>231</sup> American Review Tuberculosis, 1919, iii, 370.

One is struck by the failure of these figures to confirm the belief that influenza is a very serious complication of pulmonary tuberculosis. The patient with tuberculosis does not seem to be especially susceptible to influenza, nor is the mortality among this class higher than among the non-tuberculous. That latent or quiescent lesions may be stirred into activity is undoubted and numerous references to this feature are made, but, on the whole, the number made worse is not very large nor is the number of "new cases" dating their onset to the influenzal attack very great. Amberson and Peters<sup>232</sup> report 14 cases of influenza in tuberculous patients, one died and in 6 there seemed to be an accerbatation of the pulmonary tuberculosis. Tewksbury<sup>233</sup> believes there will be an increase in active tuberculosis due directly to the influenza epidemic, while Murphy,<sup>234</sup> after a very detailed study of the figures obtained after previous epidemics and from various other sources, comes to the opposite conclusion. He concludes that epidemics of influenza are not followed by any measurable increase in the incidence of tuberculosis.

DIAGNOSIS. Whatever may be the final estimate as to the influence of the influenza epidemic upon the incidence of tuberculosis, there is no question as to the fact that influenza has added difficulties to the diagnosis of tuberculosis. In the greater number of instances this has led to the error of diagnosis of considering as tuberculous the residual post-influenzal pulmonary conditions. The need of greater care in excluding non-tuberculous conditions before a diagnosis of pulmonary tuberculosis is made in the absence of a positive finding of tubercle bacilli in the sputum has been emphasized by a number of writers during the past two years. The same errors, however, continue to be made. Post-influenzal rales, loculated empyema, especially if at an apex, interlobar empyema and pulmonary abscess, all form a group of conditions not infrequently diagnosed as tuberculosis. McCrae and Funk<sup>235</sup> reviewed a series of 1200 consecutive cases admitted as advanced pulmonary tuberculosis and found 72, or 6 per cent., had been incorrectly diagnosed. This group of 72 cases consisted of those in whom no tuberculosis could be found. Their corrected diagnoses were as follows: Cardiac and cardio-renal disease, 19 cases; chronic inflammatory conditions of the lungs, 9 cases; bronchiectasis, 8 cases; pulmonary abscess, 8 cases; chronic bronchitis and emphysema, 6 cases; new growths, 5 cases; syphilis, 4 cases; aneurysm, anthracosis, bronchial asthma and empyema, 2 cases each; diabetes mellitus, cancer of the rectum, foreign body in the bronchus and malingering, 1 case of each.

Beattie<sup>236</sup> emphasizes the helpfulness in diagnosis of the tuberculin test. He no longer uses the methods of von Pirquet, Morro, or Calmette, but prefers to use Koch's T. A. injecting hypodermically 1 c.c. of a 1 : 1000 dilution.

Campani and Bergolli<sup>237</sup> suggests two methods of detecting involve-

<sup>232</sup> American Review of Tuberculosis, 1919, iii, 359.

<sup>233</sup> Ibid., 1919, iii, 375.

<sup>234</sup> Boston Medical and Surgical Journal, 1919, clxxxi, 266.

<sup>235</sup> Journal of the American Medical Association, 1919, lxxiii, 161.

<sup>236</sup> British Medical Journal, 1920, i, 111.

<sup>237</sup> Riforma med., 1919, xxxv, 230.

ment of a pulmonary apex by tuberculosis. The affected apex, it is claimed, can be demonstrated to transmit the respiratory murmur less well than the healthy apex for several minutes after the patient has changed from the horizontal to the sitting posture. This may be due to a localized vascular stagnation resulting from the loss of vascular elasticity in the diseased area, which congestion disappears when the patient sits up. Their second method depends upon the determination of the height of the apices by auscultation. The upper limit at which the vesicular murmur can be heard is lower on the affected than on the healthy side.

The value of the so-called "muscle sign" in chronic pulmonary tuberculosis is reported on by Halbron, Pradal and Theodoresco.<sup>238</sup> This sign consists in a myotonic reaction developed by pinching the upper border of the trapezius muscle; the reaction is local and is supposed to indicate a tuberculous involvement of the lung or pleura of the same side. This myoedema is commonly present bilaterally and the sign depends on a greater quantitative response on the diseased side. It may also be elicited from other muscles. The observers studied 157 tuberculous patients and found the muscle sign definitely increased in from 81 to 96 per cent., while only 10 per cent. of 52 healthy controls gave positive findings. In the discussion of the above paper, Sainton pointed out that while physiologists tend to consider myoedema a normal response, yet in his experience it occurs far more markedly in such conditions as typhoid fever, chronic pulmonary tuberculosis and lead poisoning, but that it may occur in a great variety of conditions including alcoholism, nephritis and various infectious diseases.

A very similar line of thought to that followed by McCrae and Funk in their article reviewed above, has led Jacquemin and Dubreuil<sup>239</sup> to recapitulate their experience during four years in respect to false and factitious tuberculosis of the lungs. They emphasize especially the possibility of mistaking certain hepatic disturbances for tuberculosis of the lungs. The likelihood to this mistake seems to the reviewer to have been somewhat exaggerated but it must be admitted that the authors are able to enumerate a number of biliary and hepatic troubles which may simulate, in one way or another, the picture of pulmonary tuberculosis. They speak with familiarity of the "liver cough" and refer to pulmonary hemorrhages resulting secondarily from gall-stones. One is more inclined to agree with them concerning mitral stenosis and chronic bronchitis.

Patients with nasal obstruction or mouth breathers from any cause are frequently diagnosed as tuberculosis and the same mistake is quite commonly made in cases of old interlobar empyema in which rupture into a bronchus and the persistence of a fistula has occurred. Their opinions about "clubbing of the fingers" are at variance with other writers. Hippocratic fingers to them are very suggestive of interlobar pleurisy and always indicate some pleural lesion. In pulmonary tuberculosis this change in the finger ends is uncommon and only appears late

<sup>238</sup> Bull. et mém. d. l. soc. méd. d. hôp. d. Paris, 1919, xliii, 973.

<sup>239</sup> Bull. méd., 1920, xxxiv, 23.



in the disease. This last opinion is opposed by the frequent finding of clubbed fingers in case of fibroid tuberculosis with bronchiectasis which has been described by Landis and others in this country. It is true, however, as Landis has pointed out, that in the ordinary chronic type of pulmonary tuberculosis the clubbing is seldom, if ever, extreme unless bronchiectasis is present. Field,<sup>240</sup> under the title chronic, non-tuberculous lung infection, touches on this same general subject. He quotes the literature of the past twenty years and states that this type of lung affection is more common today as an after-result of the influenza epidemic. Many of the cases resulting from influenza are diagnosed tuberculosis upon inadequate, and often faulty, evidence. In the series of 8 cases which Field reports, 4 had been diagnosed as tuberculosis despite the fact that the lesions were in the lower lobes and that no tubercle bacilli were ever found in the sputum. Also these 4 incorrectly diagnosed cases were all in good general health which was not to be expected if the extensive basal involvement had been due to tuberculosis, for basal tuberculosis lesions are always toxic. Field also refers to what must have been a frequent observation during the recent epidemic, the persistence of basal rales after all symptoms have subsided. Field considers that this persistence of rales may be the earliest evidence that the patient will later belong in the group of chronic non-tuberculous lung infections. This may well be true in some cases, but the persistence of basal rales for a month or six weeks after influenza is far more common than the number of chronic cases of true non-tuberculous lung infection would allow if all cases of persistent rales eventuated into chronic pulmonary infections.

The *diagnosis of cavitation in pulmonary tuberculosis* has never been so simple a matter as it would perhaps seem it should be, nor has the roentgenograph been able to settle this diagnostic question with certainty. For these reasons, Honeij<sup>241</sup> reviews the subject from both the clinical and roentgenologic aspects in an excellent article, with full references to the literature.

The roentgenologist must differentiate between true cavities in the lung structure, annular shadows due to pleural disease and intrapulmonary annular shadows. These latter are formed by two or more bronchial branches and are due to definite fibrous peribronchial changes. The true lung cavity will vary in appearance according to the amount of fibrosis which is present in its walls, and also according to its size, the amount of secretion present and the degree of fibrosis of the surrounding lung. Many factors are present to confuse the picture. However, in only 3, of the 27 cases coming to necropsy, was the roentgenographic diagnosis shown to be incorrect. Annular shadows due to pleural disease may be secondary to cavitation or may coëxist independently. Such annular shadows are, as a rule, larger and more superficial than the shadows of true cavities, nor are they as commonly circular or perfect in outline. Honeij believes that the roentgenologist errs more frequently in failing to diagnose a lesion when it is present than in diagnosing

<sup>240</sup> American Journal of the Medical Sciences, 1920, clix, 442.

<sup>241</sup> Archives of Internal Medicine, 1920, xxv, 63.

cavitation when it does not exist. Clinically, the reverse is true. The varying opinions as to the physical signs most to be depended upon in the diagnosis of cavitation would lead one to believe that it is a matter of considerable difficulty. This is especially true in children.

Sewall,<sup>242</sup> in discussing the prevalence and symptoms of *Occult Tuberculosis*, lays stress on the diagnostic importance of blood-pressure observations. The most valuable objective sign of occult tuberculosis, in his opinion, is to be found in the reaction of the blood-pressure to slight strain, such as is induced by assumption of the erect posture after lying supine. In this group of cases, vascular hypotension is the rule, and a marked lowering of pulse-pressure is a significant feature. When the patient assumes the erect posture, the pulse-pressure becomes even lower, due either to an inordinate drop in the systolic or to a rise of the diastolic pressure.

All of us have seen many patients similar to those described under this heading by Sewall. His description is as follows. "These persons are usually not sick with a definite malady; but there is a general functional insufficiency and lack of staying-power which can be brought out by submitting them to slight physical strain. They usually suffer from ill-defined misery. Sometimes complaint is made of neuralgic pains in various parts of the body; sometimes of headache and dizziness in the erect posture, and nearly always undue fatigue at the end of the day. "Nervousness" is a common characteristic. In women, the menstrual flow is apt to be scanty or frequently missed. The lungs are rarely suspected, but they give auscultatory signs and roentgen-ray pictures which indicate slight tissue sclerosis involving especially the glands at the hilum and the upper bronchial radiations. The body temperature is usually not elevated, but may rise slightly after exercise. The symptoms may often be traced directly to weakness of the organs of the circulation, or to hormonal insufficiency. The medical examiner, according to his individual predilection, would be likely to classify the cases under the title of "neurasthenia," or "hypothyroidism," or other complex of present interest. It seems probable that they form a large proportion of those recruits who were classified by boards of army examiners under the title of "effort syndrome" or "neuro-circulatory asthenia." In this group of patients Sewall believes, after excluding focal infections, that infection with the tubercle bacillus is the most frequent cause of the syndrome.

As has been said, all of us have seen such patients, and many of us may have been guilty of overlooking an incipient tuberculous infection which may certainly bring about this picture, but to assume that this whole large group of patients, with the exception of those in whom focal infection can be demonstrated, are the subjects of occult tuberculosis, seems a little too sweeping. Common sense seems to suggest that more than one cause is at work in the causation of this syndrome, and, in fact, it seems probable that more than one cause is frequently present in a single patient.

<sup>242</sup> American Review of Tuberculosis, 1920, iii, 665.

**TUBERCULOSIS IN CHILDREN.** This subject, always of such extreme interest, has received some attention but without any very marked advance in our knowledge. Hess<sup>243</sup> reminds us that human infection by tubercle bacilli takes place usually during infancy or early childhood, and that the first year of life shows a very high mortality figure from tuberculosis; probably higher than for any one other year. A latent period of about ten years ensues, to be followed by very high mortality figures for each year from puberty until the early forties. He quotes no new figures for the incidence of bovine tuberculosis in children, but gives the findings of Park and Krumwiede. These observers found, in 1912, about 15 per cent. of the deaths of children under five years of age were due to bacilli which they identified culturally as bovine in type. More recent figures would be of interest in view of the current impression that tuberculous cervical adenitis is becoming less common.

An approach at this subject is reported by R. S. Austin<sup>244</sup> who studied the incidence of *Bacillus tuberculosis* in the tonsils of non-tuberculous children. He summarizes the findings of previous reports, as follows:

#### CHILDREN'S TONSILS EXAMINED FOR TUBERCULOSIS.

Name.	Source.	Cases.	Tuberculosis.
Latham (1900) . . .	Operation or necropsy.	45	7
Friedmann (1900) . . .	Operation or necropsy.	145	17
Kingsford (1904) . . .	Necropsy.	17	7
Hess (1908) . . . . .	Operations.	13	1
Mitchell (1917) . . . . .	Operation		
With tuberculous neck glands . . . . .		100	44
Without signs of tuberculosis . . . . .		100	13

Austin studied the excised tonsils of 45 children, all of whom were well-developed and nourished. In none was there a personal history of tuberculosis, but there was some enlargement of the cervical lymph glands in 21, not, however, suggestive of tuberculosis. The tonsillar material was injected into guinea-pigs, according to a method developed by Austin which would not produce a high mortality and would not destroy the viability of the tubercle bacillus. Only one of this series gave a positive result, and the tubercle bacilli in this instance were of the human variety. Of the cases in the literature in which the type of the tubercle bacillus found in the tonsils of children was given, 8 were of the bovine type and only 2 of the human type.

Austin concludes that tuberculosis of the tonsils in children is not rare among those in whom there are tuberculous lesions elsewhere, especially in the cervical lymph glands, but that the occurrence of the tubercle bacillus in the tonsils of children without clinical evidence of tuberculosis is not frequent.

Interesting statistics are presented by Canelli concerning the finding of tuberculosis at autopsy. In 26.6 per cent. of 1004 children under the age of thirteen autopsied, definite tuberculosis was found. In the majority, multiple involvement was evident and no case of pulmonary involvement alone was found. Cavities were found in the lung in many

<sup>243</sup> Journal of the American Medical Association, 1919, lxxii, 83.

<sup>244</sup> American Journal of Diseases of Children, 1919, xviii, 14.



of the infants from one to two years of age and in 4 infants from six to twelve months old. The author quotes figures from other Italian observers giving high percentages, while he quotes Medin, of Stockholm, as having reported 8.1 per cent. of tuberculosis among 7630 infants autopsied under the age of one year. Canelli emphasizes the frequency with which the primary lesion is in the tracheo-bronchial glands or in the lungs.

In discussing the *diagnosis of tuberculosis of the lungs in children*, Ribadeau-Dumas<sup>245</sup> admits that physical examination is far from satisfactory but that assistance may be obtained by observing tuberculids and by searching for tubercle bacilli in the contents of minute cutaneous or subcutaneous abscesses which may simulate a simple purulent dermatitis. These nodular collections are the so-called tuberculous gummata of Weill and Péhu, and tubercle bacilli may frequently be found in them. Final resort, however, must be had to the roentgen ray in diagnosis is the conclusion of Ribadeau-Dumas, while in treatment he tends to favor very minute doses of tuberculin.

Stimulated apparently by the views of Ghon and others, Canti<sup>246</sup> undertook to repeat their observations. Ghon holds that there is a special form of tuberculosis in children, consisting of a primary lung focus caused by inhalation of tubercle bacilli, and, in autopsies of 644 cases, he found 184 to be tuberculous. Of these tuberculous children, 170 (92.4 per cent.) showed what he believes to be a primary focus of infection in the lung. Canti studied 84 autopsies in children up to ten years of age at St. Bartholomew's Hospital, and his findings agree substantially with those of Ghon. The outstanding features of his series are as follows:

"The almost constant finding of a lung focus when tuberculous mediastinal glands are present, and the close anatomical relation of those glands to the lung focus.

The frequent singleness of the lung focus.

The constant finding of tuberculous mediastinal glands when a lung focus is present.

The almost constant absence of a lung focus when the portal of entry appears to be elsewhere.

The almost constant absence of evidence that the portal of entry might be elsewhere when a lung focus is present."

"Preventorium" is a welcome addition to our vocabulary, if only the institutions so named can accomplish their purpose. An increasing use of this word in the literature indicates a growing interest in many countries in this preventive treatment. Applicable especially to infants and children it must be taken advantage of in the prediagnosable stage and the conviction must be on suspicion.

VACCINATION OF TUBERCULOUS PATIENTS AGAINST SMALL-POX. Two questions present themselves in this connection—first whether advanced cases of tuberculosis need to be vaccinated if exposed to small-pox, and, second, as to the possible aggravating influence of the procedure upon

<sup>245</sup> Quarterly Journal of Medicine, 1919, xiii, 71.

<sup>246</sup> Progres Médicale, 1919, xxxiv, 312.

the progress of the tuberculosis. Two reports have appeared in the past year on this subject. Mark<sup>247</sup> reports the vaccination against small-pox of 200 patients with pulmonary tuberculosis. This was necessitated by the discovery of a case of virulent small-pox who had been mingling freely with all the other patients for about ten days prior to the appearance of the eruption. Of the patients vaccinated, 70 were in the first stage of tuberculosis, 83 in the second and 47 in the third. The majority were showing evidence of some activity, and 40 had never been successfully vaccinated.

About 50 per cent. gave positive vaccinations and these occurred as frequently among the third-stage cases as among the less advanced groups and the results in the various groups could not be differentiated. No other cases of small-pox developed in the institution, and no instance of aggravation of the tuberculosis was observed.

Three or four weeks after the vaccination all of the patients were examined and no case showed any changes incompatible with the usual course of tuberculosis. The tuberculous patient who developed the small-pox recovered, and showed no relighting of his tuberculosis.

Wiese<sup>248</sup> vaccinated 220 patients in a sanatorium, all of whom had tuberculosis, 23 per cent. in the first stage, 46 per cent. in the second, 26 per cent. in the third, and 5 per cent. had glandular tuberculosis. The vaccination seems to have been done more or less as an experimental procedure and it is gratifying to observe that none of the patients showed any increase of symptoms which could be attributed to the vaccination. Two patients did show some increase of the signs in the upper lobe and some hemoptysis, but the author believes that this was not related to the vaccination.

It would seem, therefore, that vaccination against small-pox is not especially harmful to the tuberculous patient, and that it is indicated whenever exposure has taken place. Routine vaccination upon admission to an institution is, however, hardly to be recommended.

A very similar report has recently appeared concerning the effect of typhoid vaccination and of typhoid fever upon pulmonary tuberculosis. Clovis and Mills<sup>249</sup> report their experience during an institutional epidemic in which 11 tuberculous individuals developed typhoid fever and 62 patients were given three injections of typho-bacterin. Their conclusions are that no permanent bad effects followed patients with active pulmonary lesions. No case, however, was given vaccine who had abnormal temperature, or who had recently had any evidence of hemoptysis. Concerning those who developed typhoid fever, none showed any aggravation of the tuberculosis which could be attributed to the typhoid fever nor was the course of the typhoid fever influenced by the tuberculosis. The writers suggest that in such cases a high caloric feeding is indicated and that a longer than usual rest in bed during convalescence is advisable.

<sup>247</sup> Journal of the American Medical Association, 1919, lxxii, 704.

<sup>248</sup> Deutsch. med. Wchnschr., 1919, xlv, 580.

<sup>249</sup> Journal of the American Medical Association, 1920, lxxiv, 297.

TERMINAL JAUNDICE IN TUBERCULOSIS. Ameuille<sup>250</sup> is impressed by the infrequency of jaundice in pulmonary tuberculosis and gives the details of the findings in 2 cases in which this symptom occurred toward the end of the patient's life. In both, almost complete destruction of the functioning liver cells was found at autopsy, due in one instance to fatty degeneration and in the other to amyloid change, together with some fatty degeneration. There was no tuberculosis of the liver in one and but a few tubercles in the other, so that the author concludes that the jaundice cannot be attributed to direct tuberculous involvement of the liver but to the secondary destruction of the hepatic parenchyma. This is a toxic phenomenon. Such cases as are here reported are in reality not so very uncommon and have been recognized for many years.

LEUKEMIA AND TUBERCULOSIS. Much theorizing has been indulged in concerning the relation of tuberculosis to the occurrence of leukemia and more especially to the chronic form of lymphatic leukemia. Cases are on record which would tend to suggest a close relationship, but this is apparently far from a constant finding, as many autopsies prove. Ryan<sup>251</sup> reports what he considers an acute lymphatic leukemia complicating pulmonary tuberculosis in a woman aged thirty. The process was moderately advanced and tubercle bacilli were demonstrated in the sputum on several occasions. A normal blood count was found in May, 1916. Sixteen months later the patient became much worse and a slight enlargement of the cervical glands was noted. A blood count taken at this time revealed a leukocyte count of 103,200, of which 65.5 per cent. were small lymphocytes; 18.5 per cent. large lymphocytes; while the polymorphonuclear neutrophils constituted only 5.5 per cent. The remainder was made up of eosinophiles, 1.5 per cent.; transition cells, 7.5 per cent.; basophiles, 1 per cent. The patient grew steadily worse, with progressive enlargement of the lymphatic glands. The hemoglobin and red cells fell rapidly while the total white cell count rose to above 200,000, of which lymphocytes (type not stated) formed from 90 to 98 per cent. on various examinations. Death occurred fifteen days after the leukemia was recognized. No autopsy could be obtained nor does the author enter into a discussion of the possible manner by which the tuberculosis may have brought about the blood picture of leukemia. At least one case is on record in which at autopsy of a supposed chronic lymphatic leukemia, it was found that a tuberculous lymph gland had ulcerated through into a venous channel. On the blood counts presented by Ryan, one might well question the propriety of the diagnosis of the acute form of lymphatic leukemia.

BRONCHIAL CAST CONTAINING TUBERCLE BACILLI. This unusual observation is reported by Meurisse.<sup>252</sup> It is not so uncommon to have bronchial casts expectorated during or after an attack of hemoptysis in a case of pulmonary tuberculosis but in the present instance there was no coincident hemorrhage, and, in fact, the patient was considered as having a healed lesion. There had been no hemoptysis for three

<sup>250</sup> Bull. et mêm. d. l. soc. med. d. hôp. d. Paris, 1920, xxxvi, 102.

<sup>251</sup> Journal of the American Medical Association, 1919, lxxii, 472.

<sup>252</sup> Progres Médicale, 1919, xxxiv, 354.



years, and no positive sputum for three months. The membranous cast of a bronchus was expelled without dyspnea or other symptoms. It was cylindrical, 13 mm. in length by 3 mm. in diameter, of a milky-white color and moderately firm. It was easily teased out with a needle and after appropriate staining a large number of tubercle bacilli were found. There were also many lymphocytes and but few polynuclears. The author believes this to be a unique observation of a tuberculous bronchial cast occurring independently of hemoptysis.

**Digitalis in Pulmonary Tuberculosis with Hypotension.** Burnand<sup>253</sup> states that all physicians will agree that the prognosis in pulmonary tuberculosis is the more unfavorable the lower the blood-pressure. There is considerable doubt as to the exact relationship between the tuberculosis and the hypotension, but the two seem to exert an equal reaction upon each other, each making the other worse.

Of course, the pressure must be determined by an actual measurement but the appearance of the tuberculosis patient with hypotension is so characteristic as to be easily recognized. The examination of the heart is also quite characteristic of low tension. Tachycardia is common.

In this group of patients, severe grades of hemoptysis are frequent as a result of passive congestion in the lung capillaries, a state of affairs of which the peripheral cyanosis is an external evidence.

After thus emphasizing the importance of low tension, the author proceeds to discuss the therapeutic measures which may be undertaken to raise the blood-pressure. He explains the beneficial action, in tuberculosis, of camphorated oil and strychnine as being due at least in part to their influence on the chronic congestion and capillary stasis.

He believes, however, that a still more efficacious remedy is digitalis, and he has emphasized it in tuberculous patients with low pressure for the past five or six years. The results obtained confirm his belief in its value. He admits, however, that he is basing his opinion less on actual blood-pressure records than on the general picture presented by the patient before and after using. If commenced early and before the heart has been irreparably injured, it tends to preserve the cardiac function and improve the patient. One sees the dyspnea lessen, the cyanosis diminish, and other evidences of marked improvement. The blood-pressure may not show any but a temporary increase until after several months of the treatment. To obtain the best results the drug must be given intermittently over a long period of time. For example, one may prescribe 0.10 gm. ( $1\frac{1}{2}$  grains) of powdered digitalis leaves for three days in every ten; for instance on the 1st, 2d, 3d, 11th, 12th, 13th, 21st, 22d, 23d of each month.

The author admits that it is not a cure for tuberculosis but that in cases complicated with hypotension it will do a surprising amount to help improve the patient's general condition.

Guerra<sup>254</sup> also believes that the blood-pressure is of importance prognostically in tuberculosis. A normal pressure is a favorable sign,

<sup>253</sup> Arch. mal. du Cœur, des Vaisseaux et du Sang, 1919, xii, 419.

<sup>254</sup> Rev. Med. Cubana, 1919, xxx, 604; Abs., Journal of the American Medical Association.

but a sudden rise may result in bringing on an attack of hemoptysis. An explanation of the low pressure so frequently seen is said to be found in the bacterial toxemia or in suprarenal insufficiency. It would seem that if the low pressure is produced by either of these causes, it might well be reduced proportionally to the degree of toxicity and so be an index of the activity of the process and of value prognostically.

**Respiratory Function.** Although this subject is hardly in a proper stage to be adapted to this review, yet it is desirable that certain of the recent work be briefly touched upon. Advances are coming rapidly and from various directions. What is hypothesis today will be proved or discarded tomorrow. It is difficult for one not closely in touch with this line of work to keep abreast of the forward movement. Woe to the Rip Van Winkle who returns after an absence of perhaps only a year or two, to find not only new faces but new facts, and sometimes even a new language. One is apt to be bewildered by the new, and fail to see that the new is builded upon the old and familiar. And one is also apt to overlook the gaps, many of them fundamental, which existed before and which have not yet been all filled in.

Some of the advances may be credited to the war, on the one hand, as a result of research in connection with aviation, and on another from observations made concerning the nature of so-called effort syndrome or disturbed action of the heart. Other of the advances came as a result of the orderly progress of scientific research.

Let us first consider the results of ANOXEMIA or DEFICIENCY OF OXYGEN in the blood. This state of affairs may result from a number of different causes, the most easily understood of which is in the decreased oxygen tension in alveoli which is present at high altitudes. Of the other causes, pulmonary disease, reducing the oxygenation of the arterial blood in the lung capillaries, is probably the most important. Whatever the cause of the oxygen-want, the body will employ certain adaptive reactions to protect itself against any diminution in the supply of this important element and to maintain an adequate delivery of oxygen to the tissues. Oxygen-lack therefore leads to increased ventilation of the lungs, acceleration of the blood-flow and a redistribution, if not an actual increase, of hemoglobin and erythrocytes. All these are directed toward the same end. Greater ventilation permits greater oxygenation of the blood in the capillaries of the lesser circulation; accelerated blood flow speeds up quantitative delivery and increased circulating hemoglobin permits of greater total oxygen capacity of the blood. The increase in ventilation which results from slight anoxemia is obtained by an increase in the rate rather than in the depth of respiration; this is the opposite effect to that produced by accumulation of carbon dioxide and its significance will be referred to later.

Although the methods by which the body reacts protectively against a threatened oxygen-lack are always the same yet under different conditions and in different individuals, the responses may differ in order of appearance and in degree. Gregg, Lutz and Schneider<sup>25</sup> have studied

<sup>25</sup> American Journal of Physiology, 1919, 1, 302. See also editorials, Journal of the American Medical Association, 1919, lxxiii, 768, and 1920, lxxiv, 605.

this phase of the question extensively at the Medical Research Laboratory of the Air Service at Mineola. They report that some aviators respond to the lowered oxygen of high altitude almost entirely by increased respiration, others by increased blood-flow, still others show a balanced response by all three means. The respiratory response is usually the most prompt and this has been previously observed in mountain climbing. On the other hand, the changes in the hemoglobin and red cells take place much more slowly.

If the anoxemia becomes severe, the respirations, after passing through a stage of peculiar periodic rhythm, become very rapid and shallow. Haldane, Meakins and Priestley<sup>256</sup> have demonstrated the danger of this type of breathing. It is the result of anoxemia, and in turn this type of respiration brings about a diminished oxygenation of the blood. Thus a vicious circle is set up which threatens life itself unless the oxygen supply can be reestablished. Clinically, these same authors have observed in patients, with effort syndrome, a type of breathing which strongly suggests that due to intense anoxemia, the respiratory rate may be rapid and shallow. This type of breathing brings about uneven ventilation of the lungs, which tends to produce anoxemia. This same factor of uneven distribution of the air in the lungs may arise as a result of pulmonary disease, such as bronchitis or emphysema. Meakins<sup>257</sup> has further pointed out that in lobar pneumonia this shallow, rapid breathing may actually be the cause of the oxygen deficiency which occurs in this disease. While the uninvolved pulmonary alveoli can compensate for the diminished removal of carbon dioxide from the poorly ventilated parts of the lung, this is not true as regards oxygen, and anoxemia may develop. This may bring about the rapid breathing of pneumonia, which Meakins believes is a most valuable indication as to the prognosis. He does not believe that in lobar pneumonia the rapid breathing and anoxemia are the result of the mechanical reduction in the pulmonary tissue available for ventilation as practically one-half of the lung area may be made useless by pneumothorax without producing, while at rest, any evident respiratory distress.

CYANOSIS. Closely related to this question of oxygen deficiency is the work which concerns the degree of oxygen saturation of the blood. This has been carried out with especial reference to cyanosis.<sup>258</sup> Most interesting and far-reaching conclusions have been arrived at. It has been found that cyanosis is apparently never dependent directly upon an increase in the carbon dioxide content of the venous blood, nor upon a low absolute oxygen content of the venous blood. Cyanosis is directly dependent, however, upon an increase in the oxygen unsaturation of the venous blood. That is to say upon an increase above normal in the difference between the oxygen actually present in the venous blood and the total oxygen combining power of that blood. It is not sufficient for the production of cyanosis that the oxygen content alone be reduced

<sup>256</sup> *Journal of Physiology*, 1919, lii, 420, 433.

<sup>257</sup> *Archives of Internal Medicine*, 1920, xxv, 1.

<sup>258</sup> Lundsgaard, C.: *Journal of Experimental Medicine*, 1919, xxx, 259, 271, 295. Stadie, W. C.: *Ibid.*, 1919, xxx, 215. Harrop, Jr., G. A.: *Ibid.*, 1919, xxx, 241.



or that the oxygen capacity alone be altered. It is upon the amount of unsaturation of the blood with oxygen that cyanosis depends. For example, in anemia of extreme degree, cyanosis seldom, if ever, develops, for the oxygen capacity in such cases is so reduced that a sufficient degree of oxygen unsaturation to bring cyanosis cannot be present. It is claimed that when the blood pigments are reduced to such an extent that the oxygen capacity sinks below 6.5 per cent. by volume, then cyanosis becomes impossible. And yet it has been shown that the degree of cyanosis is not proportional to the amount of reduced hemoglobin present in the venous blood. It would seem that there may be an additional factor as yet undiscovered.

There are certain quantitative relations which are of interest. In the normal, the oxygen unsaturation of the arterial blood is quite constantly in the neighborhood of 5 per cent. of the total oxygen-combining power. In other words, the normal mean oxygen capacity per 100 c.c. of blood is 21.2 per cent. by volume and the mean absolute oxygen content of normal arterial blood is 20.2 per cent. by volume. It is evident, therefore, that the arterial unsaturation is 1.0 per 100 c.c. of blood being the difference between the capacity 21.2 and the content 20.2. This 1 per cent. by volume is the same as 5 per cent. of the total oxygen content, and both forms of giving this figure are employed. Mean normal figures for venous blood are as follows: The oxygen capacity is the same 21.2 per cent. by volume, but the oxygen content 15.6 is, of course, much lower than in the arterial blood as a result of the oxygen consumption in the tissue capillary beds. This in terms of unsaturation with oxygen gives 5.6 per cent. by volume as the mean figure for venous blood, or 26.8 per cent. of the total oxygen combining power.

Now it was said above that cyanosis results from an increase in the oxygen unsaturation and it has been shown that the oxygen unsaturation of the venous blood must exceed 8 volumes per cent. before cyanosis can appear. The exact figures for the capillary blood are not known, but it is probable that the normal oxygen unsaturation is about 2 to 3 per cent. by volume and that what has been spoken of as "the threshold value of mean capillary oxygen unsaturation for the incidence of cyanosis" must be about 6 to 7 per cent. We have seen that at least 8 volumes per cent. of oxygen unsaturation in the venous blood must be present for the appearance of cyanosis, but cyanosis is not a constant occurrence at this level, nor, in fact, until the venous oxygen unsaturation reaches 13 per cent. by volume. The factor which determines, in part, at what level of oxygen unsaturation cyanosis shall appear, is the level of saturation with oxygen of the arterial blood. If the arterial blood is completely saturated with oxygen, a venous unsaturation of 13 volumes per cent. may be reached before cyanosis appears. On the other hand, with an incompletely saturated arterial blood, cyanosis may appear if the venous oxygen unsaturation is raised to 8 volumes per cent.

After this preliminary discussion, we can now turn to the more clinical side of the question and consider how such conditions of increased oxygen unsaturation may be brought about. The most important basis

for alteration in the blood gas content resides in the lungs. Undoubtedly, the principal secondary cause of cyanosis is any pulmonary disorder which reduces the arterial oxygen saturation and which thus brings it about that cyanosis may readily appear. When one speaks in this connection of a pulmonary disorder, it must not be forgotten that either heart disease or lung disease may underlie the interference with normal pulmonary ventilation. The same result, as we have seen before, may be caused by decreased oxygen tension in the pulmonary alveoli, as, for example, at high altitudes. Here we touch again the question of anoxemia.

Once the arterial blood leaves the capillaries of the lesser circulation, its oxygen content remains unchanged until it enters the tissue capillaries, nor does the arterial blood differ at diverse points in the peripheral circulation. While it is true that under most conditions the venous oxygen unsaturation closely parallels the arterial oxygen unsaturation, yet the second important secondary cause of cyanosis is increased reduction of the blood during its passage through the capillary beds of the general circulation. In these capillaries the factors of active physical exertion and of retarded blood flow, as in decompensated heart lesions, are important. Either of these factors is sufficient to lead to such a degree of increased reduction of the blood, and therefore increased oxygen unsaturation, that the threshold for the incidence of cyanosis may be passed, especially in the case of exercise if the arterial blood has failed to be sufficiently oxygenated in the lungs. In the normal, after exercise, there occurs a lowering in the arterial oxygen saturation as well as a lowering in the carbon dioxide content, but the lowered oxygen content is insufficient, as a rule, to permit the appearance of cyanosis.

In cardiac disease, the changes in the oxygen figures in the blood and the appearance of cyanosis are proportional to the degree of decompensation and the presence or absence of pulmonary complication. If there is no decompensation, the oxygen unsaturation stays within normal limits and for venous blood these limits are from 2.5 to 8 volumes per cent. Just as soon, however, as decompensation develops, the oxygen unsaturation of the venous blood rises until it may reach from 9.7 to 15.2 volumes per cent. This brings it well above the figure necessary for cyanosis, and agrees with the frequency of cyanosis in decompensation. Furthermore, in patients with decompensation there is the added factor that the arterial blood exhibits a marked oxygen unsaturation.

It is a well-established clinical fact that patients with both cardiac decompensation and pulmonary disease do badly and are slow to recover from their symptoms. A partial explanation has been found in the observation that in patients with decompensation but with no pulmonary lesions, the relief of the decompensation is quickly followed by a return to normal values in the blood. On the other hand, the relief of decompensation in a patient who also has some lung involvement, fails to restore normal conditions in the blood values for oxygen and the abnormal oxygen content and unsaturation may persist until the lung lesion also has improved. In such cases the persistence of cyanosis is a direct evidence of the failure of the oxygen-carrying function of the blood to return to normal.

The extreme cyanosis so often seen in influenzal pneumonia was found by Stadie to be explained by the pulmonary lesion rather than by any circulatory failure. His figures are based upon a study of 5 normals and of 33 patients with influenzal pneumonia. In the following table the figures given are the mean figures for each group.

	Oxygen content.		Oxygen capacity.	Oxygen unsaturation.			
				Arterial.		Venous.	
	Arterial per 100 c.c.	Venous per 100 c.c.	per 100 c.c.	Per 100 c.c.	Per cent.	Per 100 c.c.	Per cent.
Normals	20.2	15.6	21.2	1.0	5.0	5.6	26.8
Pneumonias	22.9 to 7.9	20.1 to 3.6	....	....	68.2	....	85.5 to 14.4

It was found that an arterial oxygen unsaturation of over 20 volumes per cent. was usually associated with a fatal outcome. The figures in the fatal and non-fatal groups of the influenzal pneumonia patients were as follows:

Mean arterial oxygen unsaturation in fatal cases . . .	32.0 per cent.
Mean arterial oxygen unsaturation in non-fatal cases . .	13.9 "
Mean venous oxygen unsaturation in fatal cases . . .	57.0 "
Mean venous oxygen unsaturation in non-fatal cases . .	36.3 "

Cyanosis was found to be related in every instance to an increased unsaturation, and the conclusion was reached that in this type of pneumonia an incomplete oxygenation of the venous blood in the lung capillaries was the fundamental fault. This conclusion was based upon the finding in these cases first of an oxygen capacity even slightly higher than the normal as a result of a slight concentration of the blood, and, second, of a normal cardiac output. This latter was indicated by normal figures for oxygen consumption estimated by the difference between the arterial and venous oxygen unsaturation. These findings are of great interest in confirming the impression which, I am sure, any one who saw much influenzal pneumonia, both clinically and at postmortem, must have formed. There seemed to be such an evident relationship between the intensity of cyanosis, the prognostic gravity and the extent of pulmonary involvement. When the involvement of the second lung reached a certain degree, death seemed to ensue, and at autopsy one would repeatedly find about the same amount of uninvolved tissue. Neither did the behavior of the heart during life nor its postmortem appearance suggest that any very serious blame could be placed on it.

In patients with anemia, the findings were those which would be anticipated. The arterial oxygen saturation was normal and the oxygen consumption was maintained at a normal level, but a low absolute value for oxygen content in the venous blood is constantly found. This does not result in the conditions essential for the appearance of cyanosis. As has been pointed out above, patients suffering from severe grades of anemia cannot become cyanotic, as the amount of hemoglobin is insufficient. This point is reached when, as a result of anemia, the oxygen



capacity is reduced below 6.5 per cent. by volume. Here again a fact clinically familiar at last has received a satisfactory explanation.

Other factors enter into the question of the intensity of the cyanosis. Theoretically, if all of the blood-content of oxygen is attached to hemoglobin, and if cyanosis is dependent simply upon the degree of oxygen unsaturation, then the degree of cyanosis should be proportional to the amount of reduced hemoglobin. This, however, does not occur, but whether the premises are faulty or whether, as Lundsgaard suggests, the peculiarities of different individuals' skin and subcutaneous tissues play a part, it is impossible at present to say. The color and texture of the skin may have an influence, and arteriosclerosis would also seem a likely cause of variation. Furthermore, there is at least one condition which may simulate true cyanosis and yet in which the oxygen unsaturation falls within normal limits. This state of affairs exists in polycythemia, whether of the splenomegalic variety or secondary to high altitudes or congenital cardiac malformation. It is in this condition that Lundsgaard has suggested the name *erythrosis* or false cyanosis. Langstroth's<sup>259</sup> 2 cases of chronic cyanosis both show a sufficiently high venous oxygen unsaturation to readily account for the appearance of cyanosis. The author, in his discussion, inclines to the belief that the cyanosis was due to delayed passage through the capillaries rather than to any cause of anoxemia of the blood leaving the lungs. In one patient, however, a persistent thymus was present, and in the other there were evidences of an old healed tuberculosis and slight restriction of expansion of the bases of the lungs. There was also a decrease in the vital air in each case which the author considers to have been due to a slight acidosis, and not to any decrease of the respiratory surface. Langstroth also reports the count of red blood corpuscles and the hemoglobin percentage. This latter was estimated from the total oxygen combining power of the blood according to Van Slykes' method, by which higher figures are obtained than with the usual clinical instruments. This probably explains the high color index obtained in each case, and it is doubtful if conclusions concerning the color index, as it has been employed in clinical medicine, can be safely drawn when the hemoglobin is estimated by the gasometric method.

Before we leave this subject of the respiration and the gaseous exchanges which occur, it is proper that we should turn from the consideration of oxygen to touch briefly upon carbon dioxide. Formerly, it was believed that the respiratory center responded to a lack of oxygen, then it was apparently proved that the center was stimulated by any increase in the circulating carbon dioxide, but today it is generally accepted that the respiratory center is sensitive directly to the hydrogen-ion concentration of the blood which reaches the center. Indirectly, carbon dioxide has, of course, an important influence on respiration. As has been said a few pages back, a lack of oxygen brings about rapid, shallow breathing, but an excess of carbon dioxide produces the opposite result, deep slow respirations. This difference is fundamental, and must be kept in mind in all clinical interpretations of the various varieties of dyspnea.

<sup>259</sup> Archives of Internal Medicine, 1919, xxiii, 56.

Recently, a new conception concerning the reduction of blood alkali has been introduced chiefly through the work of Yandell Henderson and Haggard.<sup>260</sup> The older thought was that the blood alkali may be partially neutralized by the entrance of acids into the blood. This is the well-accepted basis of acidosis. Almost the reverse of this is the second conception; the so-called acapnial process. In this, the blood alkali is reduced indirectly. An increase of ventilation, as by excessive breathing, brings about a blowing off of the carbon dioxide of the blood to a greater degree than normal, and, as a result of the diminished blood content of carbon dioxide, the blood becomes "abnormally alkaline." In an effort to reduce this abnormal alkalinity of the blood, a part of the alkali leaves the blood and passes into the urine or the bodily tissues. This leaves an actually reduced amount of alkali in the blood. The first is fundamentally a reduction only in available alkali, the second a reduction in total alkali content. In the first instance more alkali can be made available by the elimination of acid as, for example, of carbonic acid from the lungs, while in the second the blood alkali can be added to by the recall into the blood of the excess alkali which had passed out into the tissues. Experimentally, these two conditions can be reproduced and studied, and in the acapnial form marked therapeutic results can be obtained by causing the experimental animal to inhale an increased per cent. of carbon dioxide. The subsequent increase of carbonic acid in the blood leads to a restitution of the normal blood alkali which may even exceed the original figure. Henderson, Haggard and Coburn<sup>261</sup> state that during the period of inhalation of carbon dioxide and high hydrogen-ion concentration, recovery of the circulation, respiration and intestinal motility occurs. They feel that if suitable conditions were found to exist in man the therapeutic use of carbon dioxide inhalations would be extremely valuable. It has been known that under anesthesia and operation there is frequently a considerable reduction in the alkali of the blood as measured by its carbon dioxide combining power but it has not been proved by what process this reduction is brought about. They therefore tried very cautiously the administration of carbon dioxide inhalations after operations under general anesthesia. Great care was exercised for it must be remembered that the administration of carbon dioxide insufficiently diluted with oxygen or air may be very promptly fatal. Their expectations were gratified. Within a few minutes after the inhalation of carbon dioxide was commenced, a great increase in the volume of the patient's breathing developed. The minute-volume increased from a figure often less than normal for an individual at rest, to a volume corresponding to those which the subjects would have breathed under vigorous exercise. This increase in pulmonary ventilation rapidly freed the body of ether, and consciousness returned. Under the inhalation of carbon dioxide, the blood-pressure rapidly rose, and a return of normal pink skin color. Also there was a prompt refilling of the superficial veins, indicating that the right heart was again receiving an adequate return of venous blood. This the observers consider of vital

<sup>260</sup> Journal of Biological Chemistry, 1919, xxxix, 163: (earlier work in same journal).

<sup>261</sup> Journal of the American Medical Association, 1920, lxxiv, 783.

importance, and the strength of the carbon dioxide administered was limited according to the filling of the veins in order not to overload the right heart with blood. In addition to the above results, there also seemed to be a more rapid return of normal tonus in the stomach and intestine with a corresponding lessening of the postoperative vomiting, gas pains and constipation. That these results are of great potential importance need not be emphasized. The authors suggest that the employment of "Nature's own stimulant to the respiratory center" in many applications has been waiting only on a safe and practical method of administration. This they feel they have perfected and their description will be quoted in full. The illustration is reproduced from the same article.

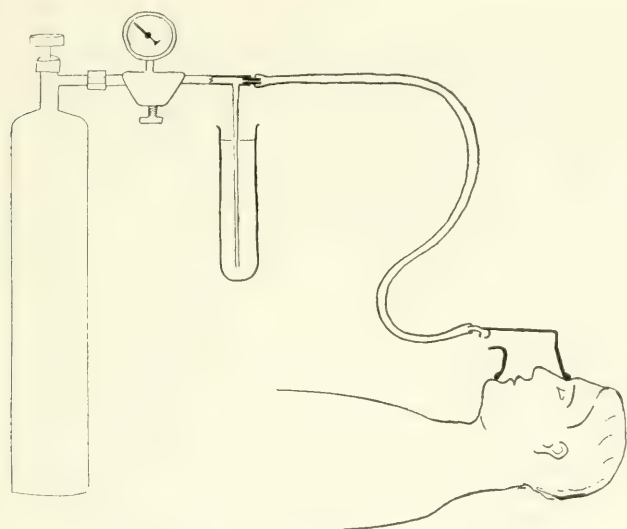


FIG. 6.—Simplified apparatus.

*The Apparatus.* The simplified apparatus used in the last series of observations is shown in the accompanying illustration. It involves a tank of carbon dioxide of the best beverage quality, and a reducing valve. From the valve the gas passes to a T-tube, one limb of which leads to a capillary tube 1.8 mm. in diameter and 10 mm. long, and the other limb to a glass tube projecting down into a vessel of water. The latter serves both as a gauge and as an escape valve, preventing any excessive pressure on the capillary. Under the maximum pressure possible, not more than 8 liters of gas pass through the capillary, which, in turn, is connected to the mask by a 5 or 6 mm. rubber tube.

The construction of the mask is simple, but involves the idea of preventing any possibility of accumulation of gas in the mask, with consequent excess administration. It depends on the subject's own breathing to draw the gas in and mix it with air. These purposes are achieved by delivering the gas through a number of small openings just outside the open end of a short, large tube (from 2 to 3 cm. in diameter)



connected with the mask. During expiration, or apnea, the gas merely wastes into the outside air; during inspiration it mixes with the inspired air. The operator controls the administration according to the reactions of the patient. With this apparatus the patient receives approximately one-half of the gas which the apparatus measures off per minute. The percentage of carbon dioxide in the inspired air depends on the volume of breathing, and the administration must be controlled accordingly.

**Notes on Physical Signs.** Nothing very new along this line has been reported, and the following brief notes are chiefly for reference. Adams and Montgomery<sup>262</sup> discuss the significance of finding in one area vocal fremitus and vocal resonance of normal or diminished intensity in association with bronchial breathing and whispered pectoriloquy. They point out the difference between the fate of the higher-pitched vibrations in normal lung tissue and in the consolidated lung. In the former, the normal lung relatively favors the transmission of rather low-pitched vibrations, while the solid lung tends to favor the transmission of sounds of all degrees of pitch by offering conditions favorable to simple conduction. These facts explain the apparently paradoxical physical signs mentioned. Such signs were a not infrequent finding in the bronchopneumonias of the recent epidemics. In fact, Lissner<sup>263</sup> has emphasized the value of increased transmission of whispered voice as an early and rapid method of recognizing pneumonic consolidation. This was also the opinion of Gordon Wilson, but, in the reviewer's experience, it has never been so helpful.

Walsh<sup>264</sup> makes a very pertinent suggestion concerning the production of the so-called cracked-pot sound. It has been obtained over some cavities and much more rarely above a pleural effusion and in occasional cases of pneumonia. It is common over the lungs of crying children during expiration. Certain characteristics of cavities are supposed to render the occurrence of this sound probable, but, as Walsh points out, just such cavities are found at autopsy without the sound having been observed during life. From the observation of a case in which the cracked-pot sound was elicited during life and in which superimposed cavities were present, Walsh obtained the idea that perhaps the presence of two or more cavities in close approximation might be the determining factor. He was able to produce the sound experimentally by percussing two open superimposed tracheas. This explanation seems to be applicable to the other clinical conditions under which the sound occurs. Any consolidation, whether from pneumonia or from pressure by pleural effusion, will cause the bronchi, if they remain open, to act like superimposed cavities. In crying children the lung is compressed by the raised diaphragm, and analogous conditions are present. Cornet mentions the sound as being heard over open pneumothorax, but neither Walsh nor Stanton have ever been able to elicit it in rather large series of cases of pneumothorax.

<sup>262</sup> Journal of the American Medical Association, 1919, lxxii, 987.

<sup>263</sup> Medical Record, 1919, xcvi, 412.

<sup>264</sup> Journal of the American Medical Association, 1919, lxxiii, 1656.

Rusca<sup>265</sup> states that there is, in his opinion, no sure sign of cavity in the lung of a child. Roentgenograms must be resorted to.

**Diseases of the Pleura.** Much of the literature concerning the pleura which has appeared during the past year scarcely falls within the scope of this review. Empyema has received much attention, and many articles concerning its surgical treatment have appeared. Undoubtedly, improved technic and results will come from this centering of interest. Certainly there seems to be an almost unanimous opinion on one point at least, this being the inadvisability of early operation in those pleural effusions occurring in the course of streptococcal pneumonia. In such cases the fluid is apt to be present early in considerable quantities and usually contains numerous long chains of hemolytic streptococci. One does not postpone thoracotomy in these cases in the hope that it will be avoided, but in the belief that later the patient will be better able to stand the operative insult and the resulting increased absorption. Repeated aspirations keep the effusion from reaching a mechanically dangerous level until after a week or ten days the pneumonic process has subsided, the respiratory function has improved, the pleural surface has become less absorptive and then adequate drainage can be established.

There has also been a tendency to supply drainage in other ways than by free incision with rib resection. Here the literature is far from being unanimous. In the reviewer's experience, once the proper time for surgical drainage has arrived then the most satisfactory results are obtained only by very free drainage.

Whether this return to almost discarded methods of treatment of empyema in these cases due to the *Streptococcus hemolyticus* will be proved in time to have been wise or not, we must be very careful not to let it influence us to a similar hesitancy toward the prompt establishment of free drainage in the more common form of empyema due to the pneumococcus.

An unusual complication of loculated empyema was reported by Thomas<sup>266</sup> and deserves to be mentioned. In two instances an encapsulated empyema ruptured into the general pleural cavity. In both patients the reaction was very marked, probably as a result of the rapid absorption from the large pleural surface suddenly bathed in the pus. The patient may have been convalescing more or less normally from a pneumonia until the sudden onset of this complication. A slight exertion results in a sudden sharp pain in the chest and within a few hours the patient has become critically ill. The temperature rises rapidly, the pulse is rapid and thready, and the respirations very rapid. Apparently, the picture may resemble that seen in some cases of spontaneous pneumothorax. However, the marked febrile reaction and the presence of a very high leukocytosis with an unusually high polymorphonuclear percentage (71,500 with 95 per cent. polys in one case, 41,000 with 98 per cent. in the other) would suggest an infectious process. Examination of the chest reveals little new, but there may be evidence of a small amount

<sup>265</sup> *Pediatrics*, 1920, xxviii, 23.

<sup>266</sup> *Journal of the American Medical Association*, 1919, lxxii, 29.

of fluid at one base. In Thomas' cases the symptoms pointed to the abdomen rather than to the chest, the upper abdomen being distended and tender. It is easy to see how one might be led to a mistaken diagnosis of acute peritonitis, a not unknown complication, or sequela of thoracic infection. As Thomas points out, prompt recognition and prompt treatment are needed to save life in certain instances.

**Pleurisy.** Horder<sup>267</sup> writes: "There are, probably, few diseases more often diagnosed without adequate reasons than pleurisy; there are probably few diseases that exist more often unsuspected. He then details fourteen notes on this subject which serve a valuable purpose in teaching or at least, in reminding us of some of the important aspects of pleurisy. Abstracted in brief they are as follows: (1) The pain of pleurisy is capable of extensive reference; it may be felt as high as the cervical vertebræ, and as low as Poupart's ligament. One of the commonest remote points of reference is the extreme tip of the shoulder. (2) Two sounds must be distinguished from the pleuritic friction. These are (a) muscular rumble especially in shivering, and (b) rhonchus. Both of these are usually bilateral and less constant than is a pleural friction. (3) Skodaic resonance beneath the clavicle, though highly suggestive of pleuritic effusion, is not pathognomonic being occasionally present in cases of solidification of the lung as in pneumonia, collapse or neoplasm. (4) "Rheumatic pleurodynia is a common condition, but it is doubtful if true rheumatic pleurisy occurs apart from rheumatic fever." (5) Primary pleurisy, with serous effusion is most often due to infection of the pleura by the tubercle bacillus. Horder then gives the evidence upon which he bases this opinion. (6) Two types of pleural effusion may complicate nephritis: (a) hydrothorax, in most instances part of a general edema, and (b) inflammatory exudate in many cases associated with infection by a streptococcus of low virulence. (7) Pleurisy, usually left-sided, may be the first event drawing attention to the existence of gastric ulcer. (8) It is not very uncommon for a pleurisy to develop between the third and the eighth day after a gastro-enterostomy. The event is somewhat alarming, but the prognosis is not necessarily bad. (9) "Pleural effusion discovered to have been latent, or to be much smaller in amount than the physical signs led the observer to anticipate, or the withdrawal of which affects the physical signs and the symptoms but little, should suggest the possibility of new growth in association with the effusion." (10) Tuberculosis is the commonest cause of blood-stained pleural effusion. Malignant disease of the lung or pleura, hemorrhagic infarct and influenza are additional causes of sanguineous effusion. (11) A valuable adjunct to the treatment of pleurisy is to immobilize the arm on the affected side by strapping it to the chest, for movements of the accessory muscles of respiration, and especially of those connected with the shoulder-girdle, are liable to prolong an attack of pleurisy. (12) There are three indications for aspiration of a serous effusion: (a) the effusion is very large; (b) the effusion is not very large, but there are symptoms of cardiac or of res-



piratory distress; (c) the effusion has been present for ten to fourteen days and shows no signs of being absorbed. (13) A reason for not aspirating every pleuritic effusion as soon as it is diagnosed, is that the lung on the side of the effusion may be the seat of active tuberculosis. In which case early removal of the fluid may cause rapid expansion of the collapsed lung and extension of the tuberculous process. An added danger is the occurrence of pneumothorax. (14) Respiratory gymnastics and breathing exercises must be carefully prescribed after an attack of pleurisy with effusion. Too enthusiastically performed, they may prolong the period of convalescence or even lead to a recurrence of the effusion.

The reviewer is inclined to agree with all of the above opinions except perhaps the one concerning the aspiration of all effusions not being absorbed after fourteen days. This is a rather short interval, and it would seem that in the absence of other indications it might sometimes be better to wait even longer. This, of course, is a much debated subject and one which cannot yet be settled.

In an effort to meet the objections to simple aspiration and to obtain better results, Weil<sup>268</sup> studied the effect of the injection of air into the pleural cavity after every puncture for the removal of fluid in sero-fibrinous pleurisy. It has been common knowledge that the accidental admission of air into the pleural cavity during an aspiration of sero-fibrinous exudate is seldom attended by serious consequences. The air is usually quite promptly absorbed. Weil points out that, by injecting air, the formation of adhesions is lessened and that when pulmonary tuberculosis is the underlying cause of the pleural effusion, the effect of the induced pneumothorax is beneficial. Thus one gains the advantages obtained by removing the heavy, infected effusion and at the same time does not lose the advantages claimed by those who argue in favor of delayed aspiration. Of course, it is important to control the degree of pressure produced in the pleural cavity by the injection of air and also to control the results by the roentgen ray. Weil reports that of 86 cases of sero-fibrinous pleurisy treated by puncture alone, 84 per cent. showed marked secondary trouble a few months or weeks later. While of 50 cases treated by the new method, 82 per cent. recovered without adhesions. In the 9 cases in which there were pleural adhesions, the affection had antedated the treatment by too long a period. Of the 50 cases treated with injections of air, 17 recovered completely in from two to three months after one injection. Several recovered in less than one month. More than one injection was required in 33 cases, but the recovery, although delayed, was just as satisfactory as in the single injection group. One patient with a rapidly recurring effusion required ten injections, and the recovery was delayed a year. Weil considers a complete success as having been achieved only when the affected diaphragm regains its normal movability.

Regard<sup>269</sup> confirms the very good results obtained by this method of treatment. As he points out, it gives the pleural surfaces the same

<sup>268</sup> Bull. de l'acad. de méd., 1919, lxxxi, 846.

<sup>269</sup> Presse méd., 1919, xxvii, 564.

repose that the effusion had supplied. It prevents the irritation and pain due to the movement of one pleural surface on the other and also prevents the formation of adhesions. Regard commences this treatment as soon as the diagnosis is made, and employs fairly large amounts of air. He states that 800 c.c. of air will do as a rule but little good, and that larger quantities must be introduced. The amount of injected air must exceed the amount of effusion withdrawn except in cases of very massive effusion.

In order to be sure that the air which is injected into the pleura is well filtered, Challamel<sup>270</sup> interposes, after the aspiration is completed, a small tube loosely packed with sterilized cotton between the trocar and the bulb which he uses to inject the air. Others use an air container similar to that used in the usual method of producing artificial pneumothorax.

Even in purulent effusions, Weil and Loiseleur<sup>271</sup> have employed this method of treatment combined with the injection of methylene blue. It is true that 7 of the 12 patients in whom they tried this method required operative measures in the end, but some escaped thoracotomy as a result of repeated aspirations and injections.

Another aspect of the treatment of sero-fibrinous pleurisy is presented in the French literature. Armand-Delille<sup>72</sup> claims very excellent results in avoiding the later development of tuberculosis after an attack of tuberculosis of a serous surface. That serofibrinous pleurisy is tuberculous in nature he does not doubt, and it is after spontaneously cured attacks of serofibrinous pleurisy that his results have been obtained by the use of full sun-baths. He has followed cured cases of serofibrinous pleurisy for six or seven years without seeing any develop tuberculosis who had taken the treatment by heliotherapy. The sun-baths should be continued for several years after the pleurisy but if this is done the patient can in other respects live an almost normal life without having to fear the ultimate development of pulmonary tuberculosis.

REPORTS OF UNUSUAL CASES OF PLEURISY WITH EFFUSION. Riesman<sup>273</sup> reports a case of pleural effusion with inversion of the diaphragm producing an abdominal tumor. The patient was aged seventy-seven years and was suffering from diabetes mellitus and chronic nephritis with moderate hypertension. The effusion developed apparently as part of the patient's general condition rather than as an inflammatory reaction. A few days after an attack of acute indigestion, dyspnea and palpitation developed which confined the patient to her room. On examination, "a large, tense, rounded mass, slightly uneven, somewhat tender, and occupying nearly the entire upper left half of the abdominal cavity" was discovered. The left chest gave all the evidences of a massive effusion, and Riesman concluded that the abdominal tumor was the inverted diaphragm containing pleural fluid. Five pints of effusion were withdrawn, and the tumor could no longer be felt.

<sup>270</sup> Bull. de la soc. med. des hôp. d. Paris, 1919, xliii, 12.

<sup>271</sup> Ibid., 387.

<sup>272</sup> Bull. de l'acad. de méd. de Paris, 1919, lxxxii, 156.

<sup>273</sup> American Journal of the Medical Sciences, 1920, clix, 353.

Riesman could find but little mention of this condition in the literature. He points out that the condition must be a result of great intrapleural pressure with gravity probably acting as a favoring factor if the patient is up and about. This condition must be considered in the differential diagnosis of abdominal masses, especially on the left side. The tumor has a peculiar bulky feel, is tender to touch, does not move with respiration, has the shape neither of the spleen nor of the kidney, and appears to have a deep attachment. Its position and shape are shown in the accompanying diagram.

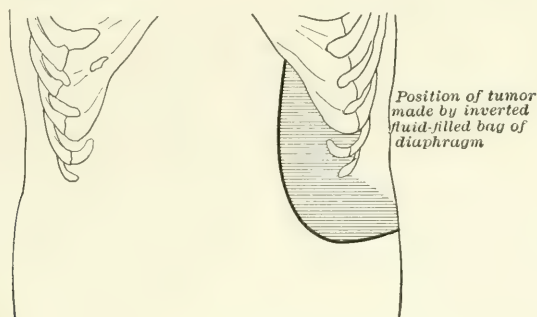


FIG. 7

Sharpe<sup>274</sup> reports 2 cases of cholesterol pleural effusion. This rare and little understood condition is named from the finding of cholesterol crystals in the effusion. These crystals give to the fluid a "spangled" or "gold paint" appearance. Cholesterol has been reported in hydrocele fluid and in pleural effusions. During the past year there has been a report of its occurrence in a pericardial effusion.<sup>275</sup> There is nothing noteworthy about the 2 cases reported by Sharpe, except that in each instance the cholesterol crystals were not observed in the fluid obtained on the first aspiration. In one, an interval of seven years elapsed between the two aspirations, while in the second a history was given of a "spangled" fluid having been aspirated in March, 1919, but aspirations in April and the early part of May of that year gave fluid which did not contain cholesterol crystals and it was not until May 21, when a fourth aspiration was performed, that cholesterol crystals were found.

An unusual case of multiple tumors is reported by Kornitzer.<sup>276</sup> The patient was returned from the front complaining of shortness of breath and pain in the chest. On examination, the evidences of pleural effusion were found, and puncture revealed hemorrhagic fluid. A diagnosis of hemorrhagic pleuritis was made. In less than three weeks after admission, the patient died. At autopsy, a round, apple-sized tumor of tough, elastic consistency was found embedded in a thick capsule on the posterior aspect of the left lower lobe. It seemed to be attached to the lung by a fibrous strand, and it was found that the pleural endothelium

<sup>274</sup> British Medical Journal, 1919, ii, 462.

<sup>275</sup> Ibid., 1919, ii, 463.

<sup>276</sup> Berl. klin. Wchnschr., 1919, lvi, 1039.



covered the tumor mass and the connecting fibrous strand. This tumor proved to be a leiomyoma which seemed to have arisen from the pleura, but as no appropriate tissue from which such a tumor might arise occurs in the pleural structure, he concludes that it may have arisen from blood-vessel muscle cells. In the right pleura there was found an endothelioma from which metastases had spread to the peritoneum and to the thoracic and abdominal lymph glands. A microscopic metastasis was found even in the leiomyoma in the opposite pleura. This almost unique case is rather of pathological than of clinical interest.

Another interesting case of neoplasm of the pleura is reported by McDonnell and Maxwell.<sup>277</sup> The interest is found chiefly in the clinical history, for although cases of endothelioma of the pleura are far from common, yet the condition is not rare enough to be considered a curiosity. The patient in this instance was a soldier, aged thirty-one, who reported at sick call that he was suffering from headache and incontinence of feces. He stated that he had had diarrhea for two weeks previously. It was observed that he was stupid and somnolent, and, after admission to the hospital, these mental symptoms grew worse. Definite auditory hallucinations were present, and a diagnosis of dementia precox was made. Eleven days after he first reported sick 500 c.c. of serosanguinous fluid were removed from the right chest. Six weeks later fluid was again diagnosed in the right chest and his mental condition, which had not improved, was ascribed to toxemia and exhaustion secondary to the chest condition. Repeated punctures of the chest failed to reveal fluid, but on each instance the needle was felt to impinge on some solid tissue. The leukocyte count was continually around 60,000, with 94 per cent. polymorphonuclears; the temperature often rose to 102° F. The roentgenologist consistently reported fluid in the right chest. After the lapse of another six weeks there were much the same findings; marked mental deterioration, right chest markedly larger than left, absolutely flat to percussion and with but faint breath sounds of a distant, tubular quality. He had become emaciated. Tubercle bacilli were never found, the serologic test for syphilis was negative. A diagnosis of new growth was then made. Death came six weeks later, or five months from the first onset of symptoms. At necropsy, the anatomic diagnosis was malignant tumor of the right pleura and lung with extension into the liver, chest wall and left pleura, and metastasis into the brain and peritoneum. Microscopically, the neoplasm was recognized as an endothelioma, and metastases were found in the liver, left pleura, suprarenal, peritoneum and brain.

It is interesting to note that the symptoms due to metastasis preceded and overshadowed those due to the primary lesion of the pleura. The mental symptoms were undoubtedly due to the metastatic involvement of the brain, and the diarrhea may have been the result of the nodules found in the peritoneum and intestinal walls. No explanation was supplied by the necropsy for the high leukocyte count.

<sup>277</sup> Journal of the American Medical Association, 1920, lxxiv, 168.

**Pneumothorax.** The reviewer must take exception to a statement recently made by Stivelman.<sup>278</sup> This author commences his article on "False Pneumothorax" with these words, "Few localized pneumothoraces can be diagnosed without the aid of the roentgen rays." To some extent this is, of course, true, and it is to be regretted that it is true to any extent. But while the reviewer admits that it is a not unusual happening that the roentgen ray should reveal a previously unsuspected localized pneumothorax, yet he is unwilling to go as far as to agree that few localized pneumothoraces can be diagnosed by physical examination unaided by the roentgen ray. This general topic is of greater importance than this specific question which has raised it in this instance. The trend today is away from thorough, careful, painstaking physical examinations and toward a too prompt recourse to the roentgenoscopic examination. This is in part due to the hurry of the times, in part to laziness, and also in part to a too unquestioning acceptance of roentgen-ray diagnosis. This tendency is noticeable in much of the literature of the day, and one therefore welcomes an article, such as this by Stivelman, which points out what the roentgenologists themselves have never denied that the roentgen-ray examination is by no means infallible. Stivelman's report is based upon a case in which the high position of the stomach led to a mistaken roentgen-ray diagnosis of hydropneumothorax. Later, studies with the barium opaque meal revealed the true state of affairs when it was seen that the opaque material entered directly into the supposed pleural collection. The author refers to similar cases in the literature and to the confusion which may be caused by diaphragmatic hernia.

Not only in true diaphragmatic hernia but also in so-called diaphragmatic eventration in which the diaphragm occupies an unusually high position, there is danger of puncturing the stomach, bowel or peritoneum in the course of an exploratory thoracentesis. When it is remembered that the dome of the diaphragm may rise to the level of the fourth rib or even higher, the importance of determining the position of this structure before introducing the exploring needle becomes obvious. In the majority of cases the fluoroscopic examination supplies this information most accurately. I remember very well a case at the Camp Meade Base Hospital in which had the exploring needle been introduced at the point decided upon by the clinician and roentgenologist, it is probable that bowel contents would have been recovered. This mortifying experience was only avoided by the sudden death of the patient, and at necropsy it was discovered that there was a complete, congenital, left-sided, diaphragmatic hernia. The whole left thoracic cavity was filled with intestine which could scarcely have escaped puncture had a thoracentesis been performed. I am familiar with the record of only one case in which fatal peritonitis was produced by the introduction of infected material from an empyema through the diaphragm during an exploratory puncture of the chest. That case antedated the roentgenograph by a number of years.

<sup>278</sup> Journal of the American Medical Association, 1920, lxxiv, 12.

Johnston<sup>279</sup> places emphasis on the usefulness of careful physical examination in the diagnosis of pneumohydrothorax and reports two interesting cases. In one a consultant had introduced a needle and obtained fluid, but had overlooked the presence of the pneumothorax. This is a point of great importance in diagnosis and prognosis.

RESULTS OF PLEURAL IRRITATION. There are certain phenomenon which we are accustomed to consider as due to pleural irritation. In the reactions which may follow aspiration of effusion it is probable that additional factors are involved but there is no question but that simple irritation may provoke marked general symptoms. We are familiar with the reference of pain from the central diaphragmatic pleura to the neck and shoulder by way of the phrenic nerve and change in the pupil on the affected side is seen. And now we are told by D'Oelsnitz and Cornil<sup>280</sup> that vasomotor disturbances may be present in the arm on the affected side. The disturbance is due to irritation of the cervical sympathetic and is best studied by some form of instrument for recording oscillations. One wonders whether the unilateral flushed cheek of pneumonia may not be found to have some such basis.

Syncope may result from pleural irritation, and, in the case reported by Montaz,<sup>281</sup> death seemed to have been due to repeated attacks of syncope from this cause. This patient was suffering from a war injury, a scrap of shell entered part way into the pleural cavity and caused severe irritation of the pleura with each respiratory movement. As the fragment was in what was considered a non-dangerous position, it was not at once removed, but death occurred within twelve hours of the injury apparently from what one might dare to call "shock." Montaz quotes a similar case where sudden death occurred from pleural irritation by a fractured rib. Morphin is claimed to be the best remedy, but removal of the cause is always indicated. Many of us undoubtedly will be reminded of cases in whom unexpectedly gratifying results followed tight strapping of the chest for the relief of pleural pain. Perhaps in some this factor of "pleural reflex" was playing a part. This evidence would seem to be an added argument for the prompt relief of pleural pain, especially in pneumonia.

<sup>279</sup> American Journal of the Medical Sciences, 1919, clviii, 105.

<sup>280</sup> Bull. d. l. soc. méd. d. hôp. d. Paris, 1919, xliii, 861.

<sup>281</sup> Lyon Chirurgical, 1919, xvi, 159.



# DERMATOLOGY AND SYPHILIS.

By JAY FRANK SCHAMBERG, M.D.

**The Incidence of Skin Affections in 8000 Men.** The following table by Hailperin<sup>1</sup> records the various types of dermatoses found among approximately 8000 white men within a few days after their arrival at Camp Lee. This table is of interest, inasmuch as it conveys an idea as to the prevalence of some types of dermatoses. Incidentally, it also gives the number of men found with open syphilitic lesions, such as chancres, mucous patches and condylomas.

## DERMATOSES AMONG EIGHT THOUSAND MEN.

Acne keloid . . . . .	1
Acne pustulosa . . . . .	75
Acne rosacea . . . . .	1
Alopecia areata . . . . .	8
Cysts, sebaceous (scalp) . . . . .	3
Canities . . . . .	2
Dermatitis venenata . . . . .	1
Eczema chronic . . . . .	16
Erythrasma . . . . .	2
Eczema seborrheic . . . . .	18
Folliculitis . . . . .	11
Erythema multiforme . . . . .	4
Lipomas . . . . .	4
Herpes zoster . . . . .	2
Ichthyosis . . . . .	8
Lupus vulgaris . . . . .	1
Parapsoriasis . . . . .	1
Pediculosis corporis . . . . .	1
Pediculosis pubis . . . . .	3
Pityriasis versicolor . . . . .	109
Psoriasis . . . . .	40
Purpura . . . . .	2
Scabies . . . . .	20
Syphilis (open lesion) . . . . .	125
Trichophytosis corporis . . . . .	3
Ulcer, varicose . . . . .	2
Urticaria . . . . .	5
Urticaria pigmentosa . . . . .	1

**Vaccine Therapy in Dermatology.** The symposium on vaccine therapy in dermatology in the *British Journal of Dermatology* contained many diversified views as to the status of this therapeutic procedure in cutaneous diseases. Sequeira and Western<sup>2</sup> seem to be the only men who retain the enthusiasm for vaccine therapy which was the rule a few years ago. Adamson is criticized by these authors for his attacks on this method of treatment.

<sup>1</sup> Journal of the American Medical Association, November 2, 1918.

<sup>2</sup> British Jour. Dermat. and Syph., April-June, 1919.

Sequeira and Western believe that in active immunization, whether by auto-inoculation or by the injection of an antigen, as in a vaccine, the first essential is that the lesion should be accessible to the body fluids. For instance, in a carbuncle or in a deeply-seated furuncle, the lesion is in contact with the body fluids and with any immunizing substance circulating in these fluids. On the other hand, a pure acne lesion is automatically outside the body, and is, therefore, inaccessible to immunizing substances in the circulation.

The stimulus, however, given by a lesion in contact with the circulating fluid in some cases fails: (1) From overstimulation and consequent paralysis of the local tissues, or (2) from understimulation to produce the necessary immunity. Here the introduction of a vaccine at some healthy part of the body may artificially stimulate the tissues to supply the required protective substances, which will then be carried to the lesion.

In staphylococcus infections, the most striking successes are found in cases of deep-seated furuncle and carbuncle. This experience is in accord with that of other workers. They have been less fortunate in staphylococcus folliculitis, of which they have seen a large number of cases in soldiers. The lesions of streptococcic impetigo, characterized by the formation of flat, epidermic vesicles containing serum, which rapidly dry up to form crusts, are usually so amenable to purely local measures that it is unnecessary to use vaccines. In erysipelas, however, striking results often follow the use of a suitable streptococcus vaccine. The fall in temperature and abolition of the toxic condition are most marked. In mixed infections, the authors have occasionally seen remarkable benefit from vaccine therapy. Of tuberculous affections, the writers have found that the dry type of lupus vulgaris does not respond to vaccine therapy.

On the other hand, scrofuloderma and lupus of the ulcerative type have proved to be much more amenable to vaccine therapy.

In tuberculides, they do not claim any practical results, even when the dose of tuberculin (B. E.) was infinitesimal.

In gonorrheal keratoderma, remarkable improvement has been seen following the use of gonococcus vaccine.

The vaccine treatment of acne vulgaris is disappointing, yet in this disease vaccine therapy is more often practised than in any other skin affection.

The occasional brilliant results which have followed the administration of *phylacogens* are to be explained by the general reaction which occurs in some instances when these bodies are injected.

Adamson's<sup>3</sup> views on vaccine therapy are unfavorable. His experience in the treatment of sycosis, of pustular acne, and of other chronic staphylococcus infections by vaccine has been distinctly disappointing, and he is unable to relate a single case of sycosis, acne, furunculosis, or impetigo which has been cured, or of which he could say that it had been definitely benefited by the treatment.

<sup>3</sup> British Jour. Dermat. and Syph., April-June, 1919.

In recent cases of furunculosis, the results have been somewhat more encouraging. In many of these more acute cases, cures have resulted apparently as the result of vaccine treatment, although even here it is difficult to lay down any rules as to dosage or to know beforehand whether the vaccines are, or are not, likely to do good. In the treatment of lupus vulgaris by tuberculin, he has been altogether unfortunate, for although some cases have at first seemed to improve, there has been subsequently, in nearly all, a more rapid spread of the disease.

In conclusion, Adamson says while it may be admitted that strikingly good results do sometimes occur as the result of vaccine treatment, we have no precise means of knowing in what doses to use it in any particular cases and no sound explanation for its action. Nor do we know why, in the majority of cases, it fails to effect a cure and only occasionally gives satisfactory results.

MacLeod and Topley<sup>4</sup> state that of all the conditions they have treated with vaccines, the only ones in which there has been definite and immediate benefit have been suppurating staphylococcus lesions, especially acute, recent and recurrent boils. By vaccines, both stock and autogenous, they have been able to cause the rapid involution of boils without the assistance of any form of local treatment, and in almost every case to keep the patient free from recurrences, though there has often been a tendency to relapse after the cessation of the vaccine treatment. In the case of chronic boils, however, especially those about the back of the neck, the results have been more uncertain and sometimes unsatisfactory.

In coccogenic sycosis, the results have been uncertain and disappointing, and not to be compared with those obtained from  $\alpha$ -ray treatment combined with suitable local applications.

The writers have tried the effect of the old tuberculin and of bacillary emulsion in the treatment of various forms of tuberculosis cutis, especially lupus vulgaris and scrofuloderma. Improvement was obtained from Koch's original tuberculin in lupus in which superficially ulcerated patches were present, and healing has taken place on the subsidence of the local reaction; but this procedure, even when small doses, such as 0.25 c.c. of 1 in 1000 were given, is too dangerous because of the possibility of stirring up unknown foci of tuberculosis in vital organs, such as the lungs.

The results with bacillary emulsion have been very irregular, and though some improvement has been obtained at times, in no cases did the benefit from injections in any way compare with that which could be obtained from appropriate local treatment.

The reviewer is firmly of the opinion that the numerous failures from vaccine therapy, in many diseases, is due to our as yet undeveloped method of preparing vaccines. The opsonin-stimulating substances are doubtless destroyed. The occasional brilliant results in such diseases as sycosis vulgaris have resulted from accidental variations in the technic of preparation at which times such substances

<sup>4</sup> British Jour. Dermat. and Syph., April-June, 1919.



were not destroyed. The value of the vaccine treatment is incontestable, despite the very high percentage of failures.

**Lichen Planus.** A symposium on lichen planus was held at the Annual Meeting of the American Dermatological Association at Atlantic City, June, 1919. Dr. E. Graham Little, of London, was the guest of the Association and opened the symposium with a paper. This paper was the result of an intensive study of 270 cases, and is the most valuable contribution to the subject of lichen planus in recent years.

Of the 270 cases, 171 were females and 99 were males. Before the war, the ratio of men to women was 6 to 11; after the beginning of the war the ratio was changed to 4 to 11. The difference is, in all probability, explained by the circumstances that the male patients decreased materially with the progress of war and the conscription of adult males rather than that the ratio was altered for any other reason.

The age incidence was found to range from five to eighty-five years, with an average age between thirty-five and fifty-five, a period which covers the climacteric in women. There was an acute onset in an unusual proportion of the cases; this was particularly true in the linear cases. In a few instances there were general illness and arthritic pain. In 1 case bullæ were found in some of the lesions.

The three types of initial lesions, the plane papule, the acuminate papule and the white papule were described in great detail, both macroscopically and microscopically. The author is of the opinion that the burnished surface of the papule, or the mother-of-pearl sheen, has been unduly stressed as being of special diagnostic import.

The occurrence of the acuminate papule is rare and in the absence of the plane papule would certainly cause much difficulty in reaching a diagnosis because of the close similarity to the papule of pityriasis rubra pilaris.

The histological appearance of lichen planus is discussed in detail.

The distribution of the plane papules is singularly constant in certain sites, of which the front of the wrist, the inner side of the knee and the nape of the neck are perhaps the commonest. Next in frequency are the sacral region, the upper and anterior aspect of the thighs, the chest, and flexor of the elbows and the lower abdomen. On the mucous membranes the tongue is less frequently diseased than the mouth, and the lips least of all. The mucous membrane of the cheeks is probably the most common of the mucous surfaces to be affected. Of the 720 cases, there were 48 in which mouth lesions occurred.

On the glans penis two forms of eruption may occur, either the white ridges as in the cheek along the interdental line, or, more commonly, the red papules arranged in ring-shapes.

Of the clinical varieties, the author found the linearis and the annularis fairly frequent, whereas the moniliformis is extremely rare. There were 13 cases of the linearis type, of which 5 occurred in children under twelve years. One interesting feature of the linearis type is the remarkable rapidity with which a solid line of papules three feet in length may be built up. In 1 case a line from the buttock to the heel developed in six weeks. As a rule, the linear type is asymmetrical, and very intractable to treatment.

In the author's series there occurred 22 cases of the annularis type, and therefore it comes next in frequency of the special types to lichen planus hypertrophicus.

Lichen planus hypertrophicus or verrucosus occurred in 40 cases, and is therefore the most common of the special varieties. The initial lesion has usually been thought to be acuminate, but the hypertrophic type is quite common in association with ordinary planus eruptions. The persistence of hypertrophic lesions is much greater than that of any other type and the warty growth may attain a huge size. The lesions are usually unilateral and they are far more frequently found on the lower, than on the upper, parts of the body.

The *etiology of the disorder* is discussed by Little at some length. A test of the nervous theory so long held by many men was afforded by a study of the statistics of the frequency of the occurrence of the disease before and after the war. The author's statistics compared with those of Croker show that, in the period between 1909 and 1918, lichen planus was only one-half as frequent as in the earlier period of Croker. Thus Croker, in 10,000 cases prior to 1893, saw 98 cases of lichen planus, an incidence of 1 per cent. In 30,000 cases of skin diseases seen at St. Mary's Hospital, Little observed lichen planus in 150, an incidence of 0.5 per cent. Adamson, Lancashire, Norman Walker, Dore, Macleod and Skinner all furnish data showing a positive diminution in cases after 1914, as compared with equal periods before that date. The incidence of lichen planus among the British troops is very difficult to estimate, for the reason that expert diagnosis was rarely obtainable. In one valuable personal experience of this kind, that of MacCormac, who was in charge of the big base hospital for skin diseases, lichen planus seems to have been extremely rare. If the civil population endured the nervous exhaustion of suspense and privation, the army must have had a plentiful experience of shock, and yet no corresponding increase of lichen planus is reported in army or civil population during this period.

Little does not believe that focal dental sepsis can be a factor in the etiology of lichen planus, inasmuch as carious teeth are very common in the civil and military population of Great Britain. Whatever the cause of lichen planus may be, its proportion is declining.

The treatment found by Little to be of the most value consists in intramuscular injections of 2 c.c. of enesol, a combination of arsenic and mercury prepared in France. As a rule, the disorder will yield to these injections within six weeks.

After an intensive clinical study of 64 cases of lichen planus which he had seen in his private practice, Charles J. White<sup>5</sup> summarizes as follows:

Lichen planus is a subacute, and, at times, an acute disease. It affects largely the educated classes, and especially those whose immediate past has been troubled; rarely, it follows an injury. It seems to occur more often in women than in men. It appears largely in the fourth and fifth decades of life. It varies greatly in duration—a few

<sup>5</sup> Journal of Cutaneous Diseases, October, 1919.

cases come and go in a few weeks; many last months; some may even persist for sixteen years. The initial lesions may favor the flexor surface of the wrists, but they may and do appear on almost any part of the body, even on the mucous membranes, where the characteristic violet discoloration becomes silvery white. The eventual distribution of the eruption may be universal. The typical objective lesion is an almost pathognomonic papule, but many variations occur, and occur commonly. The disease is always pruritic. Pathologically, we note an initial change in the corium and a subsequent epidermic alteration.

The various clinical types of lichen planus are described in detail in an instructive article by Fordyce and MacKee.<sup>6</sup> The illustrations accompanying this article are excellent.

Three cases of lichen planus in children are reported by Adamson.<sup>7</sup> In a search of the literature Adamson was able to find only 4 reports of the occurrence of lichen planus in children. This writer states that in the 3 cases he reports, in none had there been any previous ill health, and, during the presence of the eruption, the children remained otherwise well. A point of interest in regard to these occasional cases of lichen planus in young children is that they are not in accord with the usually accepted opinion that nerve exhaustion from worry and overwork are the etiological factors in the cause of this disease. Although these factors are antecedent in most cases of lichen planus in adults, yet it appears they are not a sufficient explanation of the cause of this disease.

**Scabies.** The incidence of scabies in Knowles'<sup>8</sup> experience has been a little more than 5 per cent. of the total dermatological cases observed by him during the last fifteen years. During twelve months' tenure at a large British general hospital, there were somewhat more than 2000 cases treated in the skin department, and of this number over 500 were scabies. If conditions secondary to scabies, such as furuncles, impetigo, folliculitis, septic sores and so-called "inflammation of connective tissue" (I. C. T.) were included, almost 1000 more of these cases would be classified under the former heading. In other words, 1500 of the 2000 dermatological cases were either frankly scabies or secondary scabies.

Scabies is readily differentiated from pediculosis for in the latter disease the diagnosis is based on finding the small, pinhead-sized ovum ("nit") attached to the hairs in the pubic or axillary regions; on hairy individuals, any hair on the entire surface of the body, exclusive of the scalp may show this nit. In a recent series of 200 patients minutely examined, pediculosis pubis was present in 190 of the cases.

The method of treating scabies consists on the first day of giving the patient a warm bath with plenty of soap. One rubbing is given with sulphur (precipitated sulphur, 1 dram to the ounce of petrolatum) and on each of the next three days a sulphur rubbing is given. On the fifth day the patient is given a warm bath, with plenty of soap, followed by clean clothes.

<sup>6</sup> Journal of Cutaneous Diseases, May, 1919.

<sup>7</sup> British Jour. Dermat. and Syph., January, 1920.

<sup>8</sup> Journal of the American Medical Association, November 16, 1918.



Thorough and minute examination of the entire body is made to insure that no active disease remains. If active lesions are still present, four more days of sulphur rubbing are given, followed by another warm bath, another careful examination of the skin surface and clean clothes.

There is no more efficient remedy for the treatment of all secondary pustular conditions following scabies than ammoniated mercury ointment, from 20 to 40 grains to the ounce of petrolatum. Boils in their incipience are best cured by rubbing in thoroughly each day for ten minutes a 25 per cent. ichthyol ointment; in a later stage they require opening. If boils continue to recur, or a large number are present, autogenous vaccines are indicated. Septic ulcer and "inflammation of connective tissue" not infrequently require rest in bed and the local application of ammoniated mercury, 20 grains to the ounce of zinc oxide ointment.

Atypical types of scabies are discussed by Montgomery.<sup>9</sup> He points out that scabies may mimic a generalized eczema, although in that case the eruption is apt to be more marked in the situations favored by the itch mite, such as over the elbows and on the nipples. Any eczema of the nipples, not occurring during pregnancy or lactation, should be suspected of being scabies.

The little pustule of scabies may recall those of the pyodermata, such as ecthyma, pustular acne or furuncles; which, however, have usually a different localization from that of scabies. The pyodermias, however, incident to scabies, may spread to their own favorite localization on the face and on the back of the neck for instance, and obscure the diagnosis.

Sometimes scabies causes a bullous eruption simulating the dermatitis herpetiformis of Duhring, or a pruritic pemphigus, or dysidrosis. Indeed, in dysidrosis the acarus should be carefully searched for. The acarus also may give rise to a purely itchy affection with irritability of the skin mimicing urticaria. As in every case of dysidrosis, a careful differential diagnosis should be made.

Scabies may give rise to a polymorphous eruption, with papules and roseola resembling an early syphilide, and the fact that the glans penis is a favorite locality for the itch mite, and that, in this situation, it may give rise to a lesion resembling a chancre, contributes to the confusion.

Montgomery describes the case of a young woman who had a minute vesicular eruption on the interdigital surface of the fingers, some scratch marks on the arms and in the axilla, a finely granular crusted eruption in the supramental groove and an intense pruritus.

A diagnosis of scabies was easily arrived at by shaving off the roof of a vesicle and demonstrating the parasite.

THE TREATMENT OF SCABIES AT THE HOSPITAL ST. LOUIS, PARIS, FRANCE. The treatment of scabies as carried out at St. Louis Hospital for many years by means of baths, soft soap and "pommade d'Helmerich" is painful, lengthy and costly. Milian<sup>10</sup> employs a treatment

<sup>9</sup> Journal of Cutaneous Diseases, May, 1919.

<sup>10</sup> Bull. Soc. France de Derm. et de Syph., 1919, No. 7, p. 276.

which is extremely simple, which has been tried in the army on a large scale. An ointment of polysulphate of potassium is used. This is a soluble preparation of sulphur which penetrates the epidermis without previous friction with soft soap. The application is made on two consecutive evenings and a single bath taken after the two applications followed by a change of underclothes.

**Ivy Poison.** The desensitization of persons against ivy poison is recorded by Schamberg.<sup>11</sup> During the past few years this method has been employed in my private practice with uniform success. Almost a score of susceptible persons have been treated, and all have remained free of dermatitis during the ivy season, whereas prior to undergoing this treatment they rarely escaped.

Appropriate mention may be made of a case of a twelve-year-old girl who for several years had spent a couple of months in bed each year from severe and repeated attacks of dermatitis venenata. She was so susceptible that she could not traverse a lane where ivy grew without being attacked. After taking the treatment, she was rendered immune except for an extremely slight attack which developed as a result of her purposely handling the ivy plant to test her resistance.

The method of treatment is as follows:

R—Tincture of rhus toxicodendron . . . . .	c. c.
Rectified spirit . . . . .	1
Syrup of orange, sufficient to make . . . . .	5
	100

The patient is instructed to take the mixture in half a glass of water after meals, as follows:

Breakfast, drops.	Lunch, drops.	Dinner, drops.
1	2	3
4	5	6
7	8	9
10	11	12
13	14	15
16	17	18
19	20	21

When this dosage has been reached, for purposes of convenience and simplicity, the patient takes a *teaspoonful* in half a glass of water merely *once a day*. This should be continued throughout the ivy season.

It has been my experience that the immunity (if one call it such) established after one month's administration will persist for about a month afterward. After this, susceptibility is prone to return.

**THE TREATMENT OF AN ATTACK OF IVY POISON.** The same mixture appears to exert a favorable influence on attacks of ivy poisoning in preventing an extension of the process, and in abbreviating the duration of the attack. In order to bring the patient more quickly under the influence of the drug, I administer it as follows:

Breakfast, drops.	Lunch, drops.	Dinner, drops.
2	4	6
8	10	12
14	16	18

Teaspoonful once a day, well diluted.

<sup>11</sup> Journal of the American Medical Association, October 18, 1919.

It is, of course, necessary to establish the fact that the ivy has been the cause of the dermatitis. *Rhus toxicodendron* tincture would probably be of no value in treating poison oak, primrose or other forms of plant poisoning. I think it is more than likely, however, that desensitization against these poisonous plants could be accomplished by using extracts of *Rhus diversiloba*, *Primula obconica*, etc., in the same manner as detailed above.

**Molloscum Contagiosum.** Wile and Kingsbery<sup>12</sup> produced molloscum contagiosum experimentally in the human being from the sterile filtrate of typical lesions. These workers conclude from these studies that molluscum contagiosum is caused by a filterable virus.

**Erysipelas.** The treatment of erysipelas is discussed by Guy,<sup>13</sup> who reports his observations and treatment on 80 cases. In this study, various local applications were used from time to time.

Several cases were given no local treatment whatever and the author was inclined to believe, from observation and comparison of various local applications, that they have but little influence in limiting the spread of the infection, and therefore may be dispensed with. Ichthyol is messy, makes the patient uncomfortable, and is of questionable efficacy. Boric ointment, with menthol and phenol, is quite as effective, is much cleaner and more acceptable from the patient's standpoint. Tincture of iodine adds to the local discomfort without materially affecting the disease. The same remark applies to collodion. Pure phenol is certainly not comfortable and is of doubtful service. Iced, saturated aqueous solutions of magnesium sulphate or boric acid applied on strips of gauze gave more relief than any other preparation. Of the two, the author believes that boric acid solution is the choice. This application is clean, soothing to the inflamed area, and serves, to some extent, as an antipyretic. A pan of this solution containing a piece of ice is kept at the bedside, dressings being changed as soon as they become warm. The disadvantage of this method is that it requires constant attention, either on the part of the patient himself or the nurse. However, under its use no secondary skin infections were seen, which fact coupled with the preference of the patient makes it seem worth while.

A *polyvalent antistreptococcic serum* was used in all cases; 75 per cent. of the cases were favorably influenced. Amelioration of symptoms was too closely connected with the administration of serum to be explained on any other basis. An abortive effect was obtained in 2 cases seen and injected within the first six hours of the infection. In the majority of cases following the administration of serum, there was a fall in temperature, pulse-rate and respiration, followed, in the course of a few hours, by a slowly mounting temperature, which, however, usually did not reach its original height. At the same time the toxemia was lessened, and patients were comparatively comfortable. Second and third injections usually acted in the same way, to the end that the course of the disease was in many cases probably shortened,

<sup>12</sup> Journal of Cutaneous Diseases, July, 1919.

<sup>13</sup> Ibid., June, 1919.



and in most cases certainly modified as to severity. In about 25 per cent. of the cases, serum seemed to have absolutely no effect, and in the majority of cases no particular reason could be assigned for this failure of therapy, but 2 cases were probably accounted for by reason of general debility, 1 patient having been in bed for some months as the result of a gunshot wound and the other suffering from pulmonary tuberculosis.

**Warts.** The clinical evidence in favor of an infectious agent in the causation of warts is extremely suggestive. The appearance of so-called daughter warts following the initial appearance of a large wart, the appearance of warts on contiguous and apposing surfaces, so frequently observed, the occasional occurrence in small groups of individual warts in close association, all lend color to this view. Wile and Kingery<sup>14</sup> report results of their experimental work on the etiology of common warts.

The authors undertook to produce localized hyperkeratoses by the injection of a filtrate of wart material, because it was their belief that warts might possibly be caused by a filterable virus.

The experimental work demonstrates conclusively, the authors think, that the sterile filtrate of wart material injected intracutaneously is capable of producing localized hyperkeratoses which are clinically and pathologically identical with *verruca vulgaris*. The initial experimental lesion starts as a flat wart which in no way differs from that seen in *verruca plana*. Interpapillary hypertrophy, inflammation and marked hyperkeratosis occur as secondary traumatic manifestations, whereas the initial change consists of an acanthosis and flattening of the papillae. Without denying that it is still possible that localized hyperkeratosis resembling *verruca* may be due to trauma or foreign bodies, it is definitely demonstrated that such changes can be caused by a filterable virus. It is not unlikely that when trauma and foreign bodies apparently are present as inciting factors they may merely represent the point of entrance of an infectious agent such as has been determined in these experiments.

**TREATMENT OF WARTS.** Hazen and Eichenlaub<sup>15</sup> advocates the roentgen ray as the preferable treatment for that most stubborn of all warts, the plantar variety. He reports 16 cases treated with this method. His technic is to give  $1\frac{1}{2}$  Holzknicht skin units every three to four weeks. The dosage was estimated according to the method advocated by MacKee.<sup>16</sup> A  $7\frac{1}{2}$ -inch spark gap, 9 inches focal skin distance, 4 milliamperes and one minute ten seconds were used to obtain 1 H. No filter was used. After the lesion disappeared, an additional treatment was given. The number of treatments given to each case varied from 2 to 7. The writers state that they have abandoned all other forms of treatment, using the roentgen ray alone, and quite confidently give a favorable prognosis.

<sup>14</sup> Journal of the American Medical Association, September 27, 1919.

<sup>15</sup> Ibid., May 8, 1919.

<sup>16</sup> Amer. Jour. Roentgenol., December, 1919.

For the treatment of flat warts (*verruca plana juvenilis*), Ind<sup>17</sup> recommends shaving off the growths with a sharp blade bevelled only on one side. The warts and skin around are painted three times a day with a saturated solution of salicylic acid in alcohol. On the following morning, they are cut off by the knife this passes freely over the healthy skin, but when it comes to the wart cuts it off, leaving a slightly bleeding point. The surface is painted at once with the salicylic acid solution and twice more later during the same day, three times in all. This turns the little red points to a brownish-black color, tiny scabs form which are allowed to drop off, taking about a week to do so, and leaving a perfectly clear, healthy skin. The treated area is bathed with pure alcohol once a day until the scabs have all dropped off.

A razor is of no use; a sharp instrument pushed over the skin is necessary. With this method there is neither pain nor scarring. The treatment is useless for larger warts.

Warts of the common variety may be removed by caustics, such as glacial acetic acid or trichloracetic acid, these are applied in concentrated form. Daily applications are made, care should be used in applying the acid to protect the surrounding skin. After a number of applications, the wart disappears. They may be destroyed by freezing with solid carbon dioxide. Destroying them with the electric needle after curetting is a rapid and convenient method. A very simple method of removing them is by means of a powerful convex lens, the sun's rays are focussed upon the lesion. This is repeated until the wart disappears. Small flat growths may be removed by repeated painting with a solution of salicylic acid in collodion, 10 to 20 per cent. It is doubtful if arsenic and mercury by internal administration, which have been advocated, is of any value in causing the disappearance of warts. Radiotherapy is an efficient method of treatment and may be utilized in any variety of wart. It is of particular value when the lesions are so numerous and so widely distributed as to preclude any of the foregoing measures.

**Ringworm of the Scalp** is a very common disease among children. This condition constitutes over 3 per cent. of all dermatoses. Its incidence is considerably greater in negro children than in white children. Ringworm of the scalp in adults does not occur; just why the disease should spontaneously disappear at puberty is not definitely known. This disease is markedly contagious in many instances, its appearance in a child of a family is soon followed by its appearance in the remaining children.

Hazen<sup>18</sup> discusses the *treatment of ringworm of the scalp*. He states that less than 1 per cent. of the ringworm cases can be cured by the local use of antiseptic lotions and salves, in less than three years. He points out that roentgen-ray treatment will cure 99 per cent. of the cases, and will cause no harm if properly employed. The object of the roentgen rays is not to kill the organisms but to produce a defluvium; this removes the majority of the spores which are contained within the

<sup>17</sup> British Medical Journal, July 5, 1919.

<sup>18</sup> Journal of Cutaneous Diseases, May, 1919.

hairs, reduces the food supply to the parasite, and the remainder can be killed by the antiparasitic remedies, inasmuch as such remedies can gain access to the follicles once they are empty.

The technic of roentgen-ray treatment that Hazen employs is as follows: The focal skin distance is 9 inches, the spark gap  $7\frac{3}{4}$  inches, the milliamperage 4, and the time one and one-quarter minutes; this represents a little over 4 Holtzknecht units. With such a technic one patient could be treated each ten minutes were it not for the necessity of carefully marking the spots on which the ray must center. The hair is cut short and a line drawn down the center of the scalp from the forehead hairline to the occiput. The middle of this line is roughly determined by the eye and marked with either a skin pencil or by putting a small piece of adhesive on it. This is point B. Just 5 inches anterior to this point another mark is made—point A—and just 5 inches posterior another mark—point C. On the sides of the scalp and 5 inches equidistant from each of the other points we have points D and E, on the right and left sides of the head respectively. The tube is centered over each of these points, care being taken that each exposure is given at right angles to the others and that the required dose be given. For point B the child sits upright in a chair that is provided with a headrest, and the other four points, lies on a table. When point A is being treated, the forehead and eyes must be covered with lead, when C is being treated the shoulders must be protected, and when points D and E are being exposed, the ears and sides of the face must be covered.

It is not necessary that every hair in the head be removed; the falling of the diseased hairs and of the majority of the others is sufficient to effect a cure, provided that the scalp be kept covered with an antiparasitic preparation.

Where there are but one or two small spots, it is not necessary to treat the entire scalp if the child is subject to careful and intelligent supervision, but in the majority of instances it is better to remove all of the hair at one sitting, for the falling hairs are almost certain to infect other portions of the scalp. If it be decided to treat but one spot, it is best to cut a piece of adhesive that will fit this spot and keep it adhering to the hair or else replace it as soon as it comes off. The hair will come off with the adhesive and not be scattered. Ordinarily, the defluvium is complete in about three weeks and the new hair returns in from six to twelve weeks after falling.

A mild antiseptic ointment must be used steadily until the scalp is clean. At first Hazen usually employs yellow oxide of mercury in the strength of 12 grains to the ounce, or else salicylic acid in the strength of from 15 to 20 grains to the ounce. Under no circumstances must a sufficiently strong ointment be used to cause an erythema, for this may cause permanent baldness. After the hair has fallen, full strength of practically any of the antiseptic ointments may be used to clear up any remaining patches.

**Syphilis.** PREVALENCE OF SYPHILIS. It is difficult to obtain accurate figures showing the prevalence of syphilis. The development of



the Wassermann reaction has enabled us to reach conclusions regarding syphilis that are more definite than any obtained before the introduction of this method. Day and McNitt<sup>19</sup> studied nearly 3000 patients in the hospital and out-patient services of the Barnes Hospital of St. Louis. Among their well-to-do patients, a little over 6 per cent. gave a positive Wassermann reaction. Among the middle class, represented by patients in the pay wards, something over 13 per cent. gave evidence of syphilis, and in the lower class of white patients, nearly 20 per cent. gave evidence of the disease. Among the colored patients, 30 per cent. in the wards gave a positive Wassermann reaction. In the dispensary, nearly 16 per cent. of the white, and over 40 per cent. of the colored, patients gave serological evidence of syphilis. These figures, covering a comparatively large series of patients, indicate the prevalence of the disease among the average sick and not among the average well. As the existence of a previous syphilitic infection predisposes to other diseases and induces many patients to go to the hospital with the late manifestations of syphilis of the internal organs, the figures cannot be considered applicable to the general population. Levin made an analytical study of the Wassermann reactions in more than 10,000 soldiers at the U. S. Army Base Hospital, Fort Riley, Kansas.<sup>20</sup> Based on the four plus reactions alone, there were 10.5 per cent. syphilitics among the white and 18.3 per cent. syphilitics among the negro soldiers. Considering the two plus reactions in this series as also diagnostic, the percentage of syphilitics was 13.8 for the white and 24.1 for the negro soldiers.

These figures are of value because of the large number of cases examined. They are in the main in accordance with heretofore published statistics on the prevalence of syphilis based upon the Wassermann reaction. Taking 10 per cent. as a conservative figure as representing the percentage of 4 plus reactions obtained in a Wassermann survey, there are 10,000,000 syphilitics in the United States. The realization of the seriousness of the prevalence of syphilis is apparent when one considers that "of the killing diseases, syphilis comes third or fourth." (Sir William Osler.)

The economic importance of the prevalence of this disease is apparent when one reviews the careful analytic study made a few years ago by Williams. This writer points out that of the 12,000 cases admitted annually into the State insane hospitals of New York, Massachusetts and Ohio 12.7 per cent. suffer from syphilitic mental disease. Williams made a careful study of 100 patients who died at the Boston State Hospital of syphilitic insanity. An estimation of the loss of life, based on insurance tables showing the expectation of life, and taking into consideration such factors as race, occupation, etc., shows: 2259 years' loss of life; \$212,248 loss of earning power (10 men); \$39,312 expended by the State for support; 109 children cheated of their rights of home protection. From figures based upon the average admission into the Massachusetts hospital for a period of years, Williams points

<sup>19</sup> American Journal of Syphilis, 1919, iii, 595.

<sup>20</sup> Journal of Laboratory and Clinical Medicine, November, 1919.

out that there are today in the State of Massachusetts 1500 professional men and women, business men and women, artisans, laborers, going about their various pursuits and pleasures who in the next five years will be committed to some State hospital suffering from syphilitic mental disease.

**THE PROPHYLAXIS OF SYPHILIS.** There are essentially two methods of prophylaxis. The one is the local use of calomel ointment which has been in universal use in the armies engaged in the recent war, and the other is the intravenous administration of arsphenamine.

Vedder<sup>21</sup> formulates the following outline which he has found to be a satisfactory method of using prophylaxis:

"Before intercourse use a liberal amount of vaseline or other lubricant. This aids in preventing abrasions and forms a coating through which infectious organisms can only penetrate with difficulty. As soon as possible after intercourse:

"1. Wash the genitalia thoroughly with soap and water, using plenty of soap. Reasoner has found that soap solution kills *Treponema pallidum* very promptly, and is good evidence that chancroidal infection may also be avoided very largely by a thorough cleansing with soap and water.

"2. When the prophylaxis is performed under medical instruction or by a man of sufficient intelligence this may be followed by a wash in 1 to 1000 mercuric chloride. The efficacy of this solution is undoubted, but it should not be used by ignorant persons, nor should bichloride of mercury tablets be issued as a routine.

"3. Dry, and apply about 1 dram of 33 per cent. calomel ointment in lanolin. Anhydrous lanolin should not be used and the ointment should be thoroughly mixed. This should be well rubbed in, paying particular attention to the glans, corona and prepuce, but neglecting no part of the penis and the anterior portion of the scrotum. This should be rubbed in for at least ten minutes, and should not be removed but should be allowed to remain for twelve hours, meanwhile protecting the clothes by the application of an impervious paper napkin. This favors absorption and ensures prolonged action of the mercury on any organisms that may remain.

"4. For the prevention of gonorrhea a suitable solution of some silver salt may be instilled into the urethra."

The status of calomel ointment as a prophylaxis against syphilis is well stated by Vedder:

"We may conclude that the experimental work on the prevention of syphilis and long experience with the practical use of a prophylactic have given substantially concordant results, namely, that syphilis undoubtedly can be prevented by the use of various prophylactics, and particularly by the use of 33 per cent. calomel ointment. In practice it cannot be expected that the use of the prophylactic will be invariably successful, but it seems reasonable to believe that if properly applied during the first hour after exposure, it will prevent the great majority

<sup>21</sup> Syphilis and Public Health, Lea & Febiger, 1918.

of syphilitic infections. The efficacy of the prophylactic diminishes rapidly as the time between its use and the exposure increases. In addition to this time factor there will be variations in efficacy in practice depending upon the care with which the calomel ointment is compounded and upon the intelligence and thoroughness with which it is applied."

There is evidence to justify the use of arsphenamine as a prophylaxis. Lately, it has been my custom to administer the drug intravenously to the spouses of patients in the acute stage of syphilis, and in individuals who have reason for believing they have been exposed to infection. One or two intravenous injections are administered. It is quite possible that if infection has taken place, the disease is promptly aborted. So far as it is possible to say, the prophylactic use of arsphenamine in the cases in which I have so used it, has prevented or aborted syphilis in these cases.

Of great significance in this regard are the following observations of Lacapere:<sup>22</sup> Three healthy men having had intercourse with the same women with active secondary syphilis became frightened on ascertaining that fact; and two of them consented to an injection of neo-arsphenamine; they remained free of disease. The third, who refused the injection, developed a primary lesion. The same writer gave three injections of novo-arsenobenzol to the wife of a patient who had primary lesion on the penis, and who, in spite of advice to the contrary, had frequent sexual intercourse with her; she never developed the disease.

In the above regard, the following report is an interesting one. Darier<sup>23</sup> relates how Dr. Magian, Chief of the French Hospital at Manchester, inoculated himself, March 21, 1918, in the presence of twenty physicians, with a little serous fluid from a chancre. In less than an hour afterward he was given an intravenous injection of 0.6 gm. of arsphenamine. No local or general symptoms of any kind followed, and the Wassermann test applied every month up to the time of writing has been negative.

THE EARLY DIAGNOSIS OF SYPHILIS. To prevent the spread of syphilis and to insure a cure, it is imperative that the diagnosis be made at the earliest possible moment. Klauder<sup>24</sup> presents an analysis of 115 cases of genital chancres showing the correlation of the three methods for making an early diagnosis of syphilis; dark-field examination, Wassermann reaction and clinical evidence. The laboratory diagnosis alone presents pitfalls. The dark-field examination is of paramount importance in the early diagnosis of an untreated chancre, but its usefulness is greatly lessened as the majority of genital lesions have been treated locally before the dark field apparatus is resorted to. The Wassermann reaction is indispensable in syphilis, but in later stages than the initial lesion.

<sup>22</sup> *La Traitement De La Syphilis Par Les Composés Arsenicaux*, Masson et Cie., Paris, 1918.

<sup>23</sup> *Bull. de l'Acad. de méd.*, Paris, May 20, 1919.

<sup>24</sup> *Journal of the American Medical Association*, March, 1919.



This writer records the results of the dark-field examination of 115 cases of genital chancres made at from one to more than forty days after the first appearance of the sore. In 33 chancres examined within ten days of their appearance, the dark field was positive in 31 cases, or 93.9 per cent. In 17 chancres examined within from ten to twenty days of their appearance, the dark field was positive in 9 cases, or 52.9 per cent. In 20 chancres examined within from twenty to thirty days of their appearance, the dark field was positive in 10 cases, or 50 per cent. In 5 chancres examined within from thirty to forty days of their appearance, the dark field was positive in 3 cases, or 60 per cent. The small number of cases in the last series probably explains the high percentage. In 40 chancres examined after forty days of their appearance, the dark field was positive in 12 cases, or 30 per cent. The incidence of positive dark-field examinations became less in proportion to the duration of the chancre. Of the 115 chancres with an average duration of three and four-tenths days, 65, or 57 per cent., were positive. This low percentage may in part be due to the fact that 66 per cent. of the chancres in this series had received local treatment previous to the time they were first seen. An added factor is the long average duration, as the longer the duration of the chancre, the more likely it is that its surface will heal. Furthermore, the possibility of a phimosis developing is greater. The sore is also more likely to have had local treatment, and, finally, pyogenic infection is more likely to be present.

*The Dark-field Examination.* In an untreated and uninfected chancre the dark field is positive in 100 per cent. The sore should be dressed only with physiological sodium chloride solution, boric solution, or simply warm water. No antiseptic treatment should be instituted until the diagnosis is established beyond a doubt. This is especially important because local treatment with a spirocheticidal drug greatly decreases the percentage of positive findings. The commonly used spirocheticidal drugs for local application are silver nitrate, mercury, iodine, copper sulphate and iodoform. Spirochetes become very scanty on the surface of the chancre after one application of silver nitrate which is the most powerful spirocheticide. The dark-field examination becomes negative almost uniformly after one application, although the discontinuance of its use allows a reappearance of the spirochetes on the surface. Two daily applications of calomel powder cause the spirochetes to disappear from the secretion of the chancre. Daily rubs with 1 dram of unguentum hydrargyri for one week may cause the dark-field examination to become negative. It may be mentioned here that a single injection of arsphenamine usually causes spirochetes to disappear from the secretion of chancres within from six to eight hours. Infection of a chancre with pyogenic organisms may sometimes cause the spirochete to disappear from the chancre, or reduce their number so that they can be demonstrated only with difficulty.

In previously treated chancres, the serum from the deepest part of the sore should always be examined, as it is unlikely that spirochetes will be found near the surface. When the dark-field is negative, the

application of alcohol to the surface of a chancre may be of service by dilating the lymphatics and so bringing spirochetes to the surface of the lesion.

**THE WASSERMANN REACTION IN PRIMARY SYPHILIS.** The value of the Wassermann reaction as an aid to the early diagnosis of syphilis is in proportion to the duration of the chancre. At the time of the first appearance of the sore, this reaction is invariably negative. The percentage of positive reactions gradually increases with the duration of the sore, until a short period before the appearance of the secondary eruption it becomes positive in 100 per cent. Therefore, in the early period of primary syphilis this reaction is not a very valuable diagnostic aid; in the later period, however, the reaction is of considerable diagnostic value. In Klauder's series of 115 cases of primary syphilis, the Wassermann reaction within the first ten days of the appearance of the chancre was positive in only 12 of 33 cases, or 30 per cent. In 17 cases from ten to twenty days after the appearance of the chancre, it was positive in 11, or 64 per cent. In from twenty to thirty days it was positive in 14 out of 20 cases, or 70 per cent. In 5 cases from thirty to forty days after the onset of the sore the Wassermann was positive in all. In the 40 cases existing over forty days, the reaction was positive in all. The average percentage of positive results obtained was 74.

A positive Wassermann means that a general invasion of the spirochetes has already taken place. The most favorable stage for the successful treatment of syphilis is the pre-Wassermann period, *i. e.*, the period in which the Wassermann is still negative. The disease should be diagnosed and treatment instituted before spirochetic invasion occurs. The time of appearance of a positive Wassermann reaction in primary syphilis is variable. With the cholesterolized antigen, which is the most sensitive antigen used in the Wassermann reaction, exceptional cases may be positive in the first few days of the appearance of the chancre. On the other hand, the Wassermann may not become positive until the appearance of the secondary eruption. This test should be carried out in primary syphilis, with, however, an understanding of the above reservations.

The sooner the chancre is examined, the more likely it is that the dark-field examination will be positive and the less likely the Wassermann will be positive. Later, however, the converse is true. Therefore the dark-field examination is not only the preferable laboratory test, but it is also more successful than the Wassermann reaction in the diagnosis of early syphilis.

In addition to the above methods of early diagnosis of syphilis, another laboratory method has been pointed out by Braeslach and Keane.<sup>25</sup> These writers give the technic of a rapid method of culturing the *Spirocheta pallida* from a chancre in which the presence of these organisms cannot be demonstrated by dark-field examination and the diagnosis cannot be made by other means. A thin slice of tissue is

<sup>25</sup> Journal of the American Medical Association, 1919, lxxiv, 392.

removed with a razor from the edge of the lesion. This tissue is placed in a medium consisting of normal horse serum, free from preservatives diluted with sterile distilled water in the proportion of 3 to 1. The diluted serum is put into ordinary test-tubes, which are closed with rubber stoppers, previously sterilized. The tubes are filled to within an inch of the top, stoppered, and heated to 60° C. for one hour in a water-bath. The following day the temperature is brought to 70° C. for one hour, and the next day the medium is heated at 70° C. until it takes on a consistency of syrup. The tubes are then stored in the refrigerator.

The inoculated tubes are incubated at 37° C. from three to five days when a few drops of the medium near the tissue are removed with a pipet to a slide for dark-field examination. Treponema will be found in large numbers and may be readily differentiated from other organisms.

Infected tissue can be planted as late as twenty-four hours after removal. Such tissue, placed in a bouillon tube could be forwarded to a laboratory. This rapid method of culturing treponema for diagnostic purposes is a new contribution, and is a practical one.

Rosenberger and Fanz<sup>26</sup> describe an improved method of staining *Spirochete pallida* in smears from primary and secondary lesions. The dark-field illumination is probably superior for the recognition of *Spirochete pallida* than the usual methods of staining. Rosenberger and Fanz believe that their method is equally efficient. The technic of their stain is as follows:

The suspected lesion is washed with alcohol, allowed to dry, and then rubbed with sterile gauze or gently scraped with a sterile scalpel to allow an extravasation of lymph from the deeper structures. This procedure may be enhanced by squeezing, as the organism is not superficially lodged but is contained in the lymph from the deeper areas of the chancre. Too much friction of scarification is to be avoided as a bloody lymph would obscure the organism, due to the opacity of the stain. Slides upon which the chancre smears are to be made should be scrupulously clean, and the juice from the lesion should be gently spread in a very thin layer, preferably by means of a thin glass rod or the edge of another clean slide. Thinness of the preparation is the keynote to success. Fixation is then accomplished by gently heating the slides about six to eight inches above the flame of a Bunsen burner. Four to six slides will ensure a correct diagnosis. After fixation and drying, each of the slides should be covered with ten drops of Solution No. 1 (aniline-oil water).

Aniline-oil water is made by adding 1.5 c.c. pure oil to 100 c.c. of water, and shaking thoroughly and filtering. Solution No. 1 is allowed to "soak in" to the suspected preparation for about two minutes; then solution No. 2 is added in equal amount. Solution II (oxidizing reagent). The oxidizing agent is made by adding 5 c.c. concentrated sulphuric acid and 15 grams of C. P. potassium bichromate to 375 c.c. of distilled water. This is allowed to remain for five to six minutes to

<sup>26</sup> Pamphlet, 1919. From the John H. McFadden Research Laboratory of the Jefferson Medical College, Philadelphia.



oxidize the aniline which the presumed organism has absorbed. During the action of the oxidizing solution, the color changes steadily from orange to green, dark green, and then to metallic blue-black, with the formation of a scum over the surface of the stain. Washing is the next step, and is accomplished by flushing the slide thoroughly and vigorously under a faucet of running water. After drying the slides thoroughly, immersion oil may be directly applied and the slides studied under the twelve-inch objective. The organism is seen on a delicate blue background containing precipitated granules of stain, varying in number according to the expertness of the technician and the thoroughness of the washing. The treponema itself appears as a black opaque structure displaying its specific morphology in detail. Allied organisms, particularly the *Spirocheta refringens*, can be readily differentiated; blood corpuscles and epithelial cells are likewise stained an opaque black of varying intensity.

In each case of chancre in which the organism was found by the dark-field illumination, the diagnosis was confirmed by staining by the above method.

In the proper treatment of any infectious disease with a specific drug or serum, the earlier treatment is administered the greater is the prospect of cure. The proper treatment of syphilis is no exception to this fundamental principle. On this vital principle may depend the fate of the syphilitic. If this opportunity is lost his fate may "hang upon a thread" depending on localization of the spirochetes in his body. This vital principle is the prophylaxis of tabes and paresis, of aneurysm and other forms of cardiovascular syphilis, in short syphilitic pathology which leads to mortality. The necessity of early diagnosis and treatment should be deeply and indelibly engraved on the mind of every physician who has to deal with genital lesions.

In the light of our modern knowledge of syphilis and the means at our disposal for early diagnosis and the valuable therapeutic agents at hand for treatment, it seems almost criminal that secondary eruptions of syphilis are so frequently seen. The time is at hand when a secondary eruption of syphilis should be a dermatological rarity, and the occurrence of such a phenomena should imply carelessness on the part of the physician first seeing the patient for his failure to diagnose the chancre. The only excuse is to be found in the fact that patients with secondary syphilis commonly give the history of having had very recently a "chancroid" which was "burnt" with a silver nitrate stick before an opportunity was given to the physician for correct diagnosis. The question may therefore appropriately be asked "Who first sees and treats the majority of patients with primary syphilis?" The answer is "quacks," the corner druggist, and the physician who as a routine treats all genital lesions with silver nitrate, and who either entirely neglects the valuable means at hand to diagnose the syphilitic lesion or is ignorant of these methods.

Local treatment of a chancre with a spirocheticidal drug interferes temporarily or permanently with finding the spirochetes by dark-field examination; hence, such treatment prevents the early diagnosis of a

chancere and consequently the institution of treatment. The common practice of treating genital sores locally with silver nitrate or the equally powerful spirocheticidal drug before they are properly diagnosed should be rigorously discouraged. A routine dark-field examination of every genital sore as a means to an early diagnosis should be the rule rather than the exception. We cannot hope to make any considerable progress in the prevention of syphilis and the consequences of syphilis until two movements are carried out: (1) The education of the public regarding the infection so that individuals with a genital lesion will go to a reputable physician, and (2) the education of the medical profession concerning the available means to an early diagnosis of syphilis.

**NEUROSYPHILIS.** McIver<sup>27</sup> studied the spinal fluid in 91 patients who were either in the primary or secondary stage of syphilis. This study was undertaken with the idea of determining, so far as possible, what percentage of cases of primary and secondary syphilis would show infection of the cerebrospinal fluid demonstrable by the usual laboratory methods. There was a slight increase of lymphocytes in the cerebrospinal fluid in the majority of cases. The average number of cells per cubic millimeter was 9. The spinal fluid in only 2 of the cases in the series showed a slight excess of globulin. In no instance was a 4+ Wassermann reaction obtained. Although this test was performed with only 0.2 c.c. of spinal fluid and in some instances 0.6 c.c. It is most likely that in some instances a positive Wassermann would have been obtained if 1 c.c. of spinal fluid was used in performing the test. It is desirable in performing the Wassermann reaction on spinal fluid to use decreasing amounts of fluid from 1 c.c. to 0.1 c.c.

Carnay<sup>28</sup> studied the spinal fluid in 76 patients with primary syphilis. Of the 24 cases examined with a negative blood Wassermann, the average lymphocytosis was 2.4 per c.mm. It was greater than 5 per c.mm. (this number he considered pathological) in 8 per cent. of cases. The spinal fluid Wassermann was negative in all 24 cases. In the 52 cases with a positive blood Wassermann, the average lymphocytosis was 6.1 per c.mm. It was greater than 5 in 35 per cent. of cases. The spinal fluid Wassermann was positive in one case which in addition presented a lymphocytosis of 9 per c.mm.

The heretofore published reports as to the percentage of early syphilitics presenting spinal-fluid abnormalities evidencing an early involvement of the neuraxis, vary from 20 to 90 per cent. This disagreement may in part be explained by the varying opinions as to what constitutes abnormal lymphocytosis in the spinal fluid. Different writers have chosen different standards. This standard varies from 2.5 to 10 lymphocytes per cmm. Again, varying methods have been used in performing laboratory tests.

Of the minor changes in the spinal fluid of early syphilitics, an increase of a few cells and a trace of globulin, it has been questioned by some writers whether these changes are sufficient evidence of a nervous system involvement at this period, or, whether they merely represent

<sup>27</sup> Journal of the American Medical Association, December 6, 1919, p. 1765.

<sup>28</sup> Journal of Nervous and Mental Diseases, 1919, xlix, No. 4, 282.

transient, evanescent, meningeal irritation. Those who hold this view are of the belief that only those cases which show conspicuous spinal fluid changes are candidates for one or the other of the different clinical types of neurosyphilis. The number showing these changes is usually stated to be about 10 per cent. These figures agree closely with the stated percentage of syphilitics who later develop clinical neurosyphilis. About the only available data concerning the percentage of syphilitics who in later years develop one of the other clinical types of neurosyphilis, are the frequently quoted statistics of Mattuschek and Pilz.<sup>29</sup> These writers studied the records of 4134 cases of army officers who had been infected during the two decades between 1880-1900, the investigators following their careers to the year 1911. They found that 4.75 per cent. had developed general paralysis, 2.5 per cent. tabes, and about 3 per cent. cerebrospinal syphilis. On the other hand, Ravaut is of the opinion that every change in the spinal fluid bespeaks a disease of the nervous system. To these minor changes he applied the term "meningorecidives histologique" in contradistinction to frank symptoms of meningitis.

Reference can appropriately be made to a case recently seen. This patient was examined five months after infection with syphilis. He had no subjective or objective evidence of a syphilitic involvement of the nervous system. Notwithstanding, the spinal fluid showed a lymphocytosis of 120 per c.mm., a positive globulin, a 4+ Wassermann reaction in 1 c.c. and 0.3 c.c. of spinal fluid and slight changes in the gold-sol curve. It is the existence of this type of asymptomatic early neurosyphilitic that makes it incumbent to examine the spinal fluid in order to properly diagnose and treat syphilis at an early period. Indeed, this applies with equal force in any period of syphilis, particularly should it be done before the patient is discharged as "cured." In the later periods of syphilis, the blood Wassermann is no criterion of the existence of neurosyphilis, indeed this reaction may be negative. In this period, however, one would be more likely to find neurological abnormalities, particularly pupillary, irregularity in outline and sluggish response to light reflex.

Klauder<sup>30</sup> studied the spinal fluid in acute secondary cases of syphilis before and after the administration of four intravenous injections of arsphenamine, 0.5 gm., given at weekly intervals. No other treatment was administered. In some instances it was noted that the spinal fluid, which was negative on the initial examination, was positive upon the second examination. These observations were similar to those of other writers and is in accordance with the hypothesis of Generich that arsphenamine has provocative influence upon changes in the spinal fluid of early syphilitics. Klauder attributes these provocative changes as a laboratory expression of the Herxheimer reaction, a clinical expression of which is the so-called neurorecidive.

The phenomenon of the Jarisch-Herxheimer reaction is most frequently observed in the treatment of secondary syphilis with arsphenamine.

<sup>29</sup> *Ztschr. f. ges. Neur. und Psych.*, 1910-11, iv; orig. 597, 1913, xv, 608.

<sup>30</sup> *American Journal of Syphilis*, November, 1919.



mine. This reaction, as was originally described, was a local one—an accentuation, a reddening and swelling of the macular and papular rashes occurring at times within twenty-four hours after the use of mercury. The reaction is generally conceded to be due to liberation of toxins resulting from the lytic action of mercury and arsphenamine on the parasite. Since mercury is less powerfully spirocheticidal in action than is arsphenamine, it is therefore less likely to give rise to a Herxheimer reaction. At the present time “Herxheimer reaction” is used in a more general way than to describe the original local reaction. In this sense, Milian<sup>31</sup> interprets various reactions seen after the administration of arsphenamine as a manifestation of this reaction. It is given as an explanation of the “provocative” Wassermann reaction. It is used to explain local reactions other than in the original sense, for instance, a rupture of an aneurysm following the administration of arsphenamine, or acute yellow atrophy of the liver subsequent to jaundice and arsphenamine therapy. The transitory increase in the headache in cerebral syphilis, and the shooting pains in tabes are said to be manifestations of the Herxheimer reaction.

Neurorecidive or neuro-occurrence is the appearance more usually in the earlier period of syphilis of clinical manifestations of neurosyphilis usually meningeal in origin, with or without an involvement of one or more cranial nerves, and appearing in the course of specific therapy. It usually occurs after insufficient treatment with arsphenamine and the cessation of all other treatment. “Neurorecidive” is perhaps generally conceded to be a clinical manifestation of the Herxheimer reaction. The above considerations of this reaction leads one to the conclusion that in acute cases of syphilis the initial doses of arsphenamine should be small, and preferably be preceded by the use of mercury and subsequently an adequate use of arsphenamine. If symptoms of involvement of the nervous system occur, it is not necessarily a contra-indication to the further use of the remedy, but rather the reverse, though in small doses.

**THERAPY OF NEUROSYPHILIS.** The method of intraspinal therapy which Fordyce<sup>32</sup> employs is as follows: “The patient is given an intravenous injection of salvarsan and approximately one-half hour later 50 c.c. of blood are withdrawn from an arm vein. This is permitted to clot overnight in the refrigerator. The next morning it is centrifugalized and the serum pipetted into a sterile tube. After a second centrifugalization to insure the removal of all red blood cells, the clear serum is pipetted into another tube. To this is added the desired amount of salvarsan; namely, from  $\frac{1}{10}$  to  $\frac{1}{4}$ ,  $\frac{1}{3}$ , or in certain cases of paresis  $\frac{1}{2}$  mg. This mixture is then inactivated at 55° to 57° C. for one-half hour. To arrive at the proper dosage for intraspinal therapy we make a dilution of salvarsan of which 30 c.c. represents 0.1 gm. of the drug; 10 c.c. is then further diluted with 0.5 per cent. saline solution to 35 c.c. of which 1 c.c. equals 1 mg. of salvarsan. In the administration of the medicated serum a lumbar puncture is

<sup>31</sup> *Medicine*, 1919, i, 91.

<sup>32</sup> *American Journal of Syphilis*, 1919, iii, 3.

made and about 10 to 20 c.c. of fluid withdrawn. A small gravity tube with a capacity of about 40 c.c. is attached to the needle and about 30 c.c. of fluid allowed to flow in by lowering the burette 30 c.c. To this is slowly added the serum and the mixture permitted to flow back into the canal.

Dereum,<sup>33</sup> of Philadelphia, advocates spinal drainage as the preferable method of spinal therapy and reports obtaining better clinical results with this form of treatment than with other methods. He points out that substances introduced into the spinal fluid rapidly disappear, passing through the arachnoidal villa into the venous system without entering the parenchyma of the nervous system. He states that, the view that the nutrition of the nervous system is carried on by means of the cerebrospinal fluid is a mistaken one and has led to attempts to utilize the cerebrospinal fluid of the spinal subarachnoid space as a medium of medication. He is of the opinion that it is upon the incidental spinal drainage, practised in the Swift-Ellis and allied methods, that such success as has attended the procedure depends, and not upon the apochryphal amount of arsphenamine in the serum.

Dereum attributes the beneficial results of spinal drainage to the following considerations: "To begin with there is an immediate reduction of the increased intradural pressure; secondly, the drainage results in a kind of lavage of the dural space; for the spinal fluid which has been removed is rapidly replaced. In keeping with this fact, there is a fall in the lymphocyte count. Further, there is normally a balance between the pressure in the bloodvessels within the cord and the pressure of the surrounding cerebrospinal fluid. It follows that if the pressure of the cerebrospinal fluid be abnormally increased, the vascularity of the cord will be correspondingly diminished; less blood than normally will be able to enter its vessels. It would appear, therefore, that the rapid withdrawal of the cerebrospinal fluid is followed by an increase in the vascularity of the cord—a relative hyperemia—and other things equal, of the brain as well. Probably the results—often truly remarkable—which follow radical spinal drainage are to be attributed to the improved nutrition following this increased vascularity. We have here a parallel to the results of the Bier method in surgery."

The technic of spinal drainage is as follows: The patient is put to bed, a lumbar puncture is performed, spinal fluid is withdrawn until no more flows from the cannula. The amount of fluid obtained from this procedure is variable, depending upon intraspinal pressure. Usually the fluid is under pressure in neurosyphilitics and 50 c.c. or more may be obtained; in some cases, however, considerably less an amount is obtained. It is important that the diagnosis—previous to drainage—should definitely exclude brain tumor and brain abscess, since these conditions strongly contra-indicate spinal drainage.

Spinal drainage is performed once every ten days to two weeks, on each occasion an intravenous injection of arsphenamine is administered. In the interval between drainage, courses of mercury inunc-

<sup>33</sup> Archives of Neurology and Psychiatry, 1920, iii, 3.

tions should be given, and arsphenamine injections may be repeated. By some, spinal drainage has been performed as frequently as twice weekly. We have never noted any untoward results from this form of treatment, although others have noted a reaction consisting of a severe headache lasting as long as two weeks following drainage.

Mehrtens and MacArthur<sup>34</sup> made quantitative estimations of the arsenic penetration in the meninges on about 100 spinal fluids after the various methods of intraspinal therapy.

*Group A*, of their studies, consisted of 44 cases in which the spinal drainage was performed one hour following simple intravenous injection of 0.6 gm. arsphenamine. Of these cases 43 per cent. gave positive tests for arsenic, averaging 0.036 mg. of arsenic per cubic centimeter of spinal fluid.

*Group B* consisted of 21 cases in which intravenous injection of arsphenamine was followed in less than one hour by a complete drainage of the spinal fluid. One hour after the first drainage, a second lumbar puncture was done to determine whether complete drainage tended to increase the amount of arsenic penetration. In 29 per cent. of cases arsenic penetrated in half an hour; in only 19 per cent. of cases was arsenic found on the second drainage. The average amount of arsenic penetrating in the first drainage was 0.008 mg.; in the second drainage was 0.0044 mg.

*Group C* consisted of 5 cases in which a complete drainage was made an hour before the intravenous injection of arsphenamine and this showed no arsenic penetration an hour after the injection. Apparently, timing the drainage before instead of after the intravenous injection had no advantages.

*Group D* consisted of 40 cases in which the patient's own serum was injected into the subdural space followed in from six to eight hours by an intravenous injection of arsphenamine. One hour after the injection a lumbar puncture was made. Ninety-two per cent. of these cases gave a positive test for arsenic in the spinal fluid. Quantitatively, they averaged 0.103 mg. per cubic centimeter. The meningeal irritation resulting from the serum injection ranged from a reaction of 100 to 2300 cells per c.mm.

From these observations, Mehrtens and MacArthur have demonstrated that there is produced an increased permeability of the meninges, as a result of irritation produced by the injection of plain serum. In the light of present knowledge, the beneficial results of intraspinal injections are not due to the infinitesimal amount of arsenic injected in the Swift-Ellis or Ogilvie's method, or the amount of mercury in Bryne's method of intraspinal injection. In this regard Swift<sup>35</sup> states: "That some of the beneficial effects from serum injection may be due to the introduction of the serum *per se*, for we have obtained very interesting results from the intraspinal injection of non-salvarsanized serum both in diminishing pleocytosis and strength of the Wassermann reaction."

<sup>34</sup> Archiv. Neur. and Psych., 1919, ii.

<sup>35</sup> American Journal of the Medical Sciences, 1916, clii, 4.



The studies, in 1917, of Flexner and Amos<sup>36</sup> on poliomyelitis have demonstrated a definite let-down in the barrier between the blood and the spinal fluid that could be caused by a variety of irritants (simple lumbar puncture, homologous and heterogenous sera, normal saline, Ringer's and Locker's solutions) when injected intrathecally.

In all probability the reduction of the intraspinal pressure by withdrawal of large amounts of spinal fluid increases the permeability of the meninges by the causation of a congestion, the dilated capillaries permitting the passage of their contents with greater freedom. The above factors obtain to a certain degree in the different methods of intraspinal therapy. It becomes apparent then, that the therapeutic value of intraspinal therapy is not due primarily to the intrathecal injection, but secondarily in the increased permeability of the meninges and choroid plexus due to irritation which intraspinal injection causes, thereby producing a greater access of drugs (arsphenamine and mercury) and probably immunological substances from the blood stream into the nervous tissue.

This explanation is in all probability the correct one, for any form of intraspinal therapy, whether it be "autosaltarsanized serum" of Swift, or homologous serum plus arsphenamine as advocated by Ogilvie, or of mercury as advocated by Brynes, or the injection of plain non-medicated serum or saline solution, or repeated lumbar puncture or complete spinal drainage.

These considerations lead us to the conclusion that intraspinal therapy should always be accompanied by intravenous injection of arsphenamine or neoarsphenamine. Intraspinal treatment alone is not the best or the ideal treatment of syphilis of the nervous system.

*Indication and Contra-indications to Intraspinal Therapy. Choice of Method. Interval of Treatment. Reaction after Treatment. Adjuncts to Treatment.* Intraspinal therapy should not be administered unless there are definite indications for its use. The essential indications are in those cases where intensive intravenous arsphenamine and mercury therapy have been given a thorough trial, and have failed to bring about a definite clinical improvement or have failed to improve spinal fluid abnormalities.

In all cases with a negative spinal fluid, notably vascular types of neurosyphilis and abortive cases of tabes, intraspinal therapy should not be recommended. In primary optic atrophy with a negative spinal fluid, it is questionable if intraspinal therapy is of much value; in those cases presenting a positive spinal fluid, however, the prognosis with intraspinal therapy is better. In both instances, it is only fair that the patient be given the benefit of this therapy, which should be administered, together with other treatment, as soon as the diagnosis is made.

In advanced cases of tabes, and in some cases of meningomyelitis, intraspinal injections are too irritating and these cases will likely be made worse following this therapy. In cases of this type, occasional lumbar puncture or spinal drainage is the method of choice.

<sup>36</sup> Journal of Experimental Medicine, 1917, xxv, 4.

In paresis, intraspinal therapy will frequently bring about a lengthening of the period of remission, and in this way prolong the patient's life. In the early period of this disease, it is frequently impossible to make a differential diagnosis from the diffuse type of cerebrospinal syphilis, and it is unfair in these instances not to give the patient the possible benefit of intraspinal therapy.

Solomon<sup>37</sup> reports the treatment of 10 cases of neurosyphilis (general paresis and cerebrospinal syphilis) four years or more after leaving the hospital.

Nine of these patients were committed as insane, the remaining case was diagnosed general paralysis but not necessarily committable. Eight cases were diagnosed general paralysis, 2 as cerebrospinal syphilis. The mental symptoms were those of paresis. Of the 8 cases diagnosed general paralysis, 5 are now living at home. Three are apparently entirely well, 2 while not well are able to care for themselves and live a normal life in the community. Two are dead and 1 is in a hospital. One of the two who died had a fair remission with economic efficiency for eighteen months and had all laboratory reactions negative, at one time. The one who was in a hospital had a remission of three years' duration. Two cases were diagnosed cerebrospinal syphilis (non-paretic), but with marked mental symptoms. One left the hospital apparently entirely normal and with negative laboratory signs. He has been lost from view. The other is now serologically negative and mentally normal after four years. Of 8 cases diagnosed general paralysis, 3 are apparently entirely well after four years; 2 are well enough to live outside and care for themselves. One had a remission of more than three years' duration, and is now in a hospital; 2 are dead, having had remissions of eighteen months each. Of 2 cases diagnosed cerebrospinal syphilis with mental symptoms, 1 is lost from observation, the other is mentally normal and serologically negative. This report leads the author to feel that it is possible to help a portion of these cases of general paralysis or cerebrospinal syphilis with mental symptoms and that intensive systematic treatment will change the prognosis of general paralysis. It does seem encouraging, however, that the results have been so good for such a relatively long period. The author concludes that the majority of cases of syphilis of the nervous system, whether the so-called cerebrospinal syphilis, tabes dorsalis, general paralysis or other forms, are entitled to treatment, and if this is done thoroughly, intensively and systematically the results will be gratifying. The form of treatment, mercury, iodide, arsenic, intraspinal and intracranial injections, and the amounts will necessarily depend upon the condition of each individual patient.

As a result of arsphenamine therapy, the duration of the remissions in some cases is considerably prolonged. Appropriate mention may be made of a paretic under my care who is approaching the fifth year since the appearance of the initial symptoms. During this time he has received systematic treatment with arsphenamine and mercury.

<sup>37</sup> Boston Medical and Surgical Journal, 1920, clxxxii, 60.

His subjective symptoms are markedly improved. At present he is sufficiently well to attend to his business.

The choice of the method of intraspinal therapy cannot be stated dogmatically. From laboratory data presented, one can conclude that in all probability the therapeutic basis of intraspinal therapy is inherent in each of the proposed methods. If this assumption is a correct one, then the method of choice is the one which is the simplest and most convenient of application, the least productive of harm and the most productive of good. However, it is not always an easy matter to predetermine which method is best suited to the individual case.

The original Swift-Ellis method has, it appears to us, stood the test of time, and we have obtained satisfactory results in most cases of neurosyphilis with this method. Non-salvarsanized serum of this type or patient's serum unmedicated is less irritating than those sera which are reinforced by the addition of arsphenamine or mercury. However, some competent neurosyphilologists favor the combined Swift-Ellis and Ogilvie methods. On the other hand, spinal drainage appears to be the choice of method by some neurosyphilologists.

The interval in which intraspinal therapy should be administered is about every two weeks, although in some instances it may be given more frequently. It is desirable to administer the treatment in courses, say four or five with a month or more intervening between courses. At the time of treatment the patient should be in bed and remain there (a strict bed patient) for at least twenty-four hours. After treatment the patient should lie quietly, preferably without a pillow and with the foot of the bed elevated.

Since the method of intraspinal injection which involved the injection of 1 mg. or more of arsphenamine has become obsolete, the danger of intraspinal therapy is almost negligible. A few cases of severe aseptic meningitis and indeed death have been reported following intraspinal injections, but these accidents are not frequent enough to cause the method to be discarded. In our experience, most patients experience no discomfort following intraspinal therapy. However, in some instances the response to intraspinal medication is sufficiently severe to interdict further treatment. As already mentioned, intraspinal treatment should be suspended if any irritative symptoms arise and should be abandoned if these recur or if the patient's clinical condition is made worse.

It is advisable to continue intraspinal therapy until the cerebrospinal fluid is normal. However, a persistent degree of spinal fluid abnormality is not inconsistent with an apparently stationary lesion and clinically arrested case. On the other hand, a negative spinal fluid after treatment is not absolute evidence of the subsidence or cure of a once existent lesion. The recurrence of a positive spinal fluid is an exception rather than the rule.

The cytology is usually the first phase in the spinal fluid to be influenced by treatment. The next phase is a modification in the intensity of the globulin reaction, although a slightly positive reaction may be obtained for a long time after the other phases have become negative.



A gradual weakening in the strength of the Wassermann reaction and a change in the gold-sol are the next phases to change. The first change in the Wassermann occurs in the high dilutions of spinal fluid and this is always of good prognostic import. Rapid changes in the Wassermann do not usually occur.

Intravenous and intraspinal therapy in neurosyphilis should always be accompanied by the administration of mercury and potassium iodide; our aim in treatment is not only directed toward the elimination of symptoms, but toward the elimination of the underlying process, namely, syphilis. Moreover, the patient must be treated as well as his disease. Many neurosyphilitics are psychoneurotics, they are anxious and apprehensive, they are likely to wrongly attribute many trivial symptoms to their underlying neurosyphilis. The intelligent patient may become apprehensive lest he become parietic. It is important to point out that these psychoneurotic symptoms may be the initial ones of paresis, but the above reference is not made to that type of early parietic.

In many cases, even after a clinical and serological cure has been obtained, the patient is not restored emotionally. Collins<sup>38</sup> very appropriately calls attention to this in a paper entitled "Syphilitic Scars of the Spirit." He states that "although the infection is thwarted and the patient regains what seems to be his health, he is left with a scar of his mind and his emotions which permanently cripples him to a certain degree."

Hygiene and dietetic treatments are important adjuncts to treatment. The ataxia in tabes may often be improved by reëducation exercises, the description of which may be found in text-books on neurology.

**PULMONARY SYPHILIS.** In the paper on pulmonary syphilis, Funk<sup>39</sup> states that syphilis of the lungs has not been as frequent in his experience, as has been reported by some writers. However, he believes that it occurs clinically more often than the older observers would have us believe, and more often than postmortem evidence would seem to indicate. Among 1200 patients referred to the wards of the Jefferson Chest Hospital, there were 72 non-tuberculous cases, or 6 per cent., and of these, 4 cases were pulmonary syphilis. In other words, syphilis of the lungs was found in 4 instances among 1200 patients who were thought to be unquestionably tuberculous.

The pathology of syphilis of the lungs is reviewed by this writer. In the secondary stage a bronchitis of varying severity is not uncommon. In a certain group of these patients there is an associated apical catarrh giving rise to fine crackling rales which may be interpreted as tuberculosis. The difficulty of differentiation may be great when it is recalled that the two diseases are not infrequently associated, or when a superimposed syphilis activates an old tuberculous lesion. These "apical rales" with the associated bronchitis will clear up under treatment if due to syphilis. The clearing up is more prompt and more complete than that due to tuberculosis activated by lues.

<sup>38</sup> Journal of the American Medical Association, May 1, 1918.

<sup>39</sup> Pennsylvania Medical Journal, March, 1920, p. 310.

Syphilis of the lungs commonly manifests itself as gummata, which may occur anywhere in the lung, but usually near the root or in the lower lobes. They may break down and form small cavities; or they may be converted into fibrous tissue and the resulting contraction and puckering may distort the lung and give rise to considerable bronchiectasis. The gummata of the lung may be latent, and they have been found at necropsy in those who during life gave no evidence of pulmonary disease. Syphilis of the lung may manifest itself as a diffuse fibrosis. The fibroid lesions of this character do not possess any cardinal characteristics and cannot be distinguished during life from fibrosis due to tuberculosis and other causes.

Funk gives the following as an aid in the differential diagnosis of pulmonary syphilis and tuberculosis: The history; if the absence of contact to tuberculosis infection; the previous condition of health and habits; the history of a syphilitic infection. The presence of concomitant signs of syphilis in other organs. Tuberculosis involves at first the apices of the lungs and spreads therefrom. A primary basal lesion is extremely rare. Syphilis, on the other hand, usually involves the hilus areas or the bases and the presence of such a lesion strongly suggests a non-tuberculous lesion, and among these we find the cases of lues. In patients with advanced tuberculosis and those with persisting prevalent sputum due to tuberculosis practically always have bacilli in their sputum. Whenever the sputum of a patient with symptoms and signs of advanced disease is repeatedly negative for tubercle bacilli, it is wise to think of some other pathological process, including syphilis. An examination of the sputum for the presence of *Spirocheta pallida* have not been made sufficiently carefully or often to determine its diagnostic value. A positive Wassermann reaction does not necessarily mean that a pulmonary lesion is syphilitic. The Wassermann reaction assumes diagnostic importance in regard to the pulmonary lesion when all the tests for tuberculosis are negative. The roentgenographic shadows correspond to the following classification (Watkins): Syphilitic consolidation in which the roentgenogram presents a massive shadow involving either the entire lobe or a large portion of the lobe contiguous to the mediastinum, diminishing in density toward the periphery. Early diffuse sclerosis in which the roentgenogram represents an evenly distributed radiating linear marking or a diffuse speckling throughout the lung, sometimes bilateral. Dense sclerosis in which the roentgenogram has a characteristic pyramidal shadow, with the base at the hilum, and with lance-like projections into the lung substance. This shadow is to be looked for in the lower or middle lobe, and not in the apex or upper lobe as in tuberculosis.

THE RESPONSE TO ANTISYPHILITIC TREATMENT. No known drug can do in pulmonary tuberculosis what arsphenamine, mercury and the iodides can do in pulmonary syphilis.

Carrera<sup>40</sup> reports the results of a pathological study of the lungs in 152 autopsy cases of syphilis. As a result of this study there were 12

<sup>40</sup> American Journal of Syphilis, January, 1920.

cases with histological changes in the lungs which were regarded as undoubted syphilitic lesions. These cases were classified into two groups: (1) Gumma, with peribronchial lesions and arteritis, 5 cases falling into this group, 3 of them in the first subdivision; (2) fibrosis and arteritis, embracing 7 cases, 3 showing definite syphilitic processes in the vessels alone. In addition, this worker noted that the lungs of syphilitics show an incidence of fibrous comparable with that observed in other organs of the same cases. They showed also a high percentage of pulmonary pathogenic conditions in part at least referable to the coincident myocardial affection. To what extent the high incidence of fibrosis of the lungs is due to syphilis alone cannot be decided, but it is probable that the lung is not exempt from involvement in the mild inflammatory process caused by syphilis in other organs, and which lead eventually to fibrosis.

The dark-field examination of the sputum for the presence of *Spirocheta pallida* as a means to the diagnosis of pulmonary syphilis cannot be relied upon. *Spirocheta microdentum*, a harmless parasite whose habitat is the mouth, is very similar morphologically to *Spirocheta pallida*. There are morphological differences between the two organisms, but this differentiation can only be made by one exceptionally skilled in the recognition of spirochetes. Other spirochetes which may be found in the mouth and sputum are much more easily differentiated from *pallida*.

There is little to be said concerning the treatment of pulmonary syphilis. Arsphenamine, mercury and potassium iodide should be administered in the appropriate manner.

In one who has been infected with syphilis for some time, the occurrence of active tuberculosis may be brought about by a lowering of resistance as a result of the primary infection. The course of the tuberculosis does not differ, however, from that occurring in non-syphilitic individuals. On the other hand, if both diseases develop simultaneously or within a short time of each other, the patient is likely to become overwhelmed. A latent tubercular infection, as a result of a syphilitic infection is likely to become extremely active and to pursue a rapid and acute course. I have recently seen an instance of this. An individual in the secondary stage of syphilis who in addition presented symptoms of an acute pulmonary tuberculosis. Prior to his infection with syphilis he presented no symptoms of tuberculosis.

The coexistence of pulmonary tuberculosis and syphilis without lung involvement is common. In these instances antisyphilitic therapy may result in an improvement of the tubercular infection. In view of this, it behooves one to have the Wassermann test made routinely in all cases of tuberculosis, and to administer treatment in those cases in which the Wassermann is positive. In the administration of antisyphilitic therapy to those cases with pulmonary tuberculosis and syphilis without lung involvement, one should be guided by the physical condition of the patient. Potassium iodide cannot be used as liberally as in non-tubercular cases.



IMMUNITY IN SYPHILIS. Syphilis, like all protozoal infections, is characterized by the lack of circulating antibodies as occurs notably in the acute infectious diseases. This and the peculiar localized tissue immunity present in syphilis are obstacles in the possibility of a serological therapy of syphilis.

Kolmer<sup>41</sup> reviews the entire subject of immunity in syphilis. He points out that the general results of animal inoculation experiments has been to show that the syphilitic person or lower animal acquires definite resistance to reinoculation soon after the appearance of the initial sore and at a time when the microparasites may be regarded as having gained a wide distribution; this resistance becomes almost absolute during the secondary or most active period of the disease, declining somewhat in the tertiary stages. With complete cure, there appears to be a gradual return to susceptibility to reinfection; of particular importance, therefore, are the well-established facts that the only persons or lower animals possessing resistance to syphilis are those harboring living treponemata and that this resistance rapidly disappears with the sterilization of the body, indicating that antibodies, if produced at all, do not persist in the body cells and fluids as occurs in many other of the infectious and notably in the acute infectious diseases. As Neisser has said, direct inoculation with syphilitic virus is the best index of cure or persistence of the disease, finding in his experiments with apes that immunity existed only while the animal harbored living treponemata, susceptibility to reinfection following cure by specific medicinal agents.

Resistance to reinfection, however, cannot be said to be absolute in any stage of the disease; there are a sufficient number of experiments to indicate this and, of course, it is well known that the uncured syphilitic is subject to recrudescence and new organs and tissues may be successively attacked during the process of the disease. Animal experiments have shown that this immunity in syphilis or resistance to reinfection is largely local in nature in monkeys and man where the microparasites are rapidly distributed throughout the body, resistance becomes more general and complete; but in rabbits, in which the lesions develop in a few organs only, and notably the testes and cornea, resistance is apparently limited to the particular organ or organs that have previously been the seat of a lesion.

A study of the body fluids, and especially blood serum and cerebrospinal fluid of syphilitics have shown that known antibodies are not developed at all, or but to a slight extent. Following the successful cultivation of the treponema by Noguchi, Kolmer found that agglutinins were produced in rabbits by immunization with these cultures but only to a slight extent in persons suffering with syphilis; treponemacidal substances could not be demonstrated in the blood at all in any stage of the disease. Subsequent experiments by others have shown, however, that these agglutinins for culture pallida do not agglutinate virulent pallida, thereby reducing in value any significance that may

<sup>41</sup> Archives of Pediatrics, April, 1920.

be attached to the immunological value of agglutinins insofar as resistance to syphilis is concerned. It is highly probable that phagocytosis of virulent treponemata likewise plays but a minor role in resistance to infection by normal tissues although the resistance of syphilitic tissue to reinfection may be due in part to local phagocytosis by the fixed tissue cells, constituting in part the "tissue indifference" or "anergie" of Neisser.

As is now well known, the Wassermann reaction cannot be regarded as indicating the presence of protective antibodies, inasmuch as the reaction is biologically non-specific and due to the presence of a secondary product of the body cells, treponemata or both, independent of true resistance or immunity. Complement-fixation tests conducted with salt solution extracts of pure cultures of *Treponema pallida* may be accepted as indicating the presence of pallida antibodies, but the percentage of positive reactions is relatively small and weak in all stages of the disease, and their significance as an indication of immunity further diminished by the experiments of Kolmer and his colleagues, and later confirmed by others. This shows that the positive reactions are in part non-specific as in the Wassermann reaction, due to the presence of lipoidal substances which may be obtained from other microparasites as *Bacillus typhosus* and *Bacillus coli*. The Wassermann reaction is an indication of infection and to a certain degree of the severity of the infection, but it is not an expression of immunity. While biologically non-specific, its practical diagnostic value remains high and scarcely to be overestimated because the peculiar changes in the serum and spinal fluid responsible for the reaction appears in so few other diseases.

The luetin anaphylactic skin test is likewise a reaction of infection rather than immunity. Kolmer's studies with this and similar reactions have indicated quite clearly that the positive reaction is not to be accepted as an indication of immunity. In this connection it is stated that subsequent studies have shown that anaphylactic skin reactions, including the tuberculin reaction, are produced only in the presence of living infection and that their severity is to a certain degree a measure of the acuteness and extent of the particular infection under study. While Noguchi believes that a positive luetin reaction may occur after the cure of syphilis due to the persistence of antibodies after complete sterilization, it is highly probably that a persistently positive skin reaction is like the persistently positive Wassermann reaction, an indication of incomplete cure, even though the patient is clinically free of the disease.

All studies indicate, therefore, that unfortunately persons possess no natural immunity to syphilis; when such appears to be the case it is highly probable that the immunity is due to the fact that they harbor living treponemata. Even when infection occurs the resulting immunity is but of minor degree, probably sufficient to protect the majority of persons against reinfection but not enough to protect themselves against extension of their own infection to new tissues or organs in their own body; the antibodies in cells and body fluids are so few as to

largely escape detection and rapidly prove ineffective for protection after complete cure. In other words, the only persons apparently immune to inoculation with syphilis are those who are actually syphilitic, although their infection may be dormant and escape clinical detection, but frequently discovered by such immunological tests as the Wassermann and luetic reactions.

**REINFECTION AND CURE IN SYPHILIS.** Schamberg<sup>42</sup> reports a second attack of syphilis two years after the first. The initial infection in this individual was in June, 1917, at which time he had a suspected chancre of the meatus, and a macular syphilide. He received at this time an intravenous injection of neoarsphenamine and mercury administered by mouth. In August, 1917, he complained of headaches. His pupils were unequal and the patella reflexes were exaggerated. The Wassermann reaction was positive. A second dose of neoarsphenamine was administered.

The patient came under my care September 9, 1917. Three days later, the Wassermann reaction with cholesterinized antigen was + + + +; with alcoholic extract of syphilitic liver, +; and with acetone insoluble lipoids + + + +. Between September 22 and November 15, 1917, the patient received 8 intravenous injections of arsenobenzol brand of arsphenamine, the Wassermann reaction becoming negative after the first injection, but relapsing to a weak positive on several subsequent occasions.

He was drafted into the Army and while at two southern camps, because of a deep scar on the glans penis, had a blood test taken monthly for nine months. All of these tests proved negative.

After his discharge from the Army, he again lived with a woman with whom he had been living before he entered the Army. April 4, 1919, he appeared at my clinic at the Polyclinic Hospital with a generalized pinkish-red roseola. This developed within a fortnight into an extensive varioliform syphilid, covering the face, trunk and extremities. There was a large chancre on the foreskin opposite the corona, a site different from that of the first chancre. Six Wassermann tests made between April 26 and May 26 were strongly positive (+ + + +) despite seven administrations of arsphenamine and neoarsphenamine. During this period, the chancre and eruption promptly disappeared under the treatment.

Cases of this character are most instructive in the light they throw on the curability of syphilis. The excellent pathological researches of Warthin at Ann Arbor were persuading many physicians to believe in the dictum enunciated many years ago (under a different therapeutical regimen). "Once a syphilitic, always a syphilitic."

In the majority of cases prolonged treatment is necessary to bring about a permanent reversal of the Wassermann reaction, yet there exist cases in which the disease is apparently eradicated by a few injections of arsphenamine and the Wassermann becomes negative over a long period. The criterion of cure in syphilis cannot be stated dog-

<sup>42</sup> Journal of the American Medical Association, September 13, 1919.



matically. The evidential value of negative Wassermann tests is not conclusive. I have not infrequently seen this test negative in the blood of a person with a gumma. I have also seen this test recur as long as two years after a period of negativity. The provocative negative Wassermann we now know is not a very valuable criterion of cure. When we consider the chronicity of syphilis, and the fact that lesions may occur after an interval of freedom from symptoms lasting thirty or forty years, it is evident that freedom from symptoms alone cannot be considered a proof of cure. The only positive proof of cure is a second infection. As long as a patient is syphilitic he is immune to a second infection. Obviously then, a second infection is proof that he was free from syphilis.

We know from clinical observation that treatment should extend beyond the time the Wassermann first becomes negative. This fact is apparently not sufficiently recognized. One single negative Wassermann is little evidence of cure; obviously many negative Wassermann reactions over a long period after the cessation of treatment constitute stronger evidence. Another link of evidence in the determination of cure is the nature and duration of treatment and the stage of syphilis in which treatment was first given. The possibility of cure with the least amount of treatment is greatest in the primary stage before the appearance of a positive Wassermann. Given a case with a history of having had syphilis and an amount of treatment what is believed to have been insufficient to cure the infection, the Wassermann reaction is negative and a complete physical examination discloses no evidence of syphilitic pathology. How is the negative Wassermann to be interpreted? The infection is either cured or is latent. There are two alternatives, one is to administer no treatment but to have the Wassermann test made at intervals, say every three months, over a long period, one to two years. If the Wassermann remains negative, the evidence of cure becomes stronger, if it should become positive, treatment should be administered. The other procedure is to administer courses of treatment over a long period on the presumption that the disease is latent.

In view of cures, such as the one above reported, we may perhaps place more faith in repeatedly negative serological tests and the absence of symptoms as indications of probable cure.

In the communication by Pollitzer,<sup>43</sup> in which a second infection of syphilis is reported, he aptly remarks, "But where in the old days we had 1 case of reinfection we now have a hundred. Every one of these cases, of course properly authenticated, is an absolute proof of the superiority of our present methods over the past. The prognosis of syphilis has been incalculably enhanced by the new remedies." I believe that we are in a position at the present day, with more powerful and scientific drugs at our command, to state that syphilis is a curable disease.

<sup>43</sup> Journal of the American Medical Association, March, 1920.

**WASSERMANN REACTION.** In regard to the Wassermann reaction, most attention at present is being given the studies of Kolmer<sup>44</sup> and his associates upon the subject of the very much to be desired standardization of technic. In reference to this, the following quotations from Kolmer's introductory paper may be given:

"Probably no laboratory test has been subject to as much favorable and unfavorable criticism and to as many modifications in technic as Wassermann's serum test for syphilis; owing to the fact that the reaction is not strictly or biologically specific for syphilis and requires several biological reagents of varying properties, it is readily subject to error in both a positive and negative way unless carefully and intelligently understood and conducted, and largely for these reasons has fallen into disrepute with many physicians and surgeons.

Many of the proposed modifications of the original technic have been demanded by an increasing experience and knowledge of the reaction and several have undoubtedly served to improve its delicacy and value, but the employment of different methods by various persons has led to wide variation in the results, confusion in regard to the actual value of the test and insistent demand for one standard method.

Within recent years several publications have drawn particular attention to discrepancies in the results of Wassermann reactions with the same serum in different laboratories and, indeed, to varying results reported by the same serologist on specimens of blood from the same individual withdrawn at the same time and under identical conditions."

"I believe all serologists of experience agree that a certain percentage of discrepancies are to be expected with the use of different hemolytic systems and reagents and particularly different antigens, even granting that all tests were conducted with the requisite technical care and attention to details; I do not know the legal value of the Wassermann reaction, but I surmise that the testimony of several serologists under close cross-examination upon the witness stand would bid fair to outshine the exhibition of alienists in regard to conflicting statements. But the Wassermann reaction is only one of numerous laboratory tests requiring standardization to increase value and reliability; for example, it is well known that the much simpler Widal reaction may yield varying results in different laboratories with portions of the same specimen of blood and indeed, conflicting reports on the results of urinalysis with portions of the same specimen of urine containing traces of albumin or sugar, may be expected. Nevertheless, it is the overwhelming consensus of opinion that the Wassermann reaction possesses great value in the diagnosis of syphilis and as a serological guide to treatment, owing largely to the fact that the individual physician has learned to rely upon the work of at least one of his colleagues, but, owing to the nature and importance of the disease to the individual and community, standardization of the technic for

<sup>44</sup> See series of papers in *American Journal of Syphilis*, beginning, vol. iii, No. 1, January, 1919.

the serum diagnosis of syphilis is especially desirable in order to increase the delicacy and reliability of the reaction."

"Realizing the complex nature of the Wassermann reaction and the variable properties of its several biological reagents, our almost complete ignorance of its mechanism and the absence of a specific and wholly satisfactory antigen, the task of even attempting standardization was considered a serious and laborious problem; knowing that the majority of serologists had an individual way of conducting certain steps in the technic and particularly that many had learned from experience to rely so firmly upon their own method as to be very loath to accept any other, the hope of building up a widely acceptable technic would appear almost hopeless unless an unexpected discovery bestowed upon the standard technic an indisputable quality of excellence. The method pursued in this investigation, which has covered a period of several years, was to become acquainted with all existing methods by thoroughly reviewing the available literature and by means of personal communications and interviews with a large group of serologists and submitting the whole to careful unbiased experiment and choosing that proving best on the basis of actual trial and receiving endorsement on the basis of experience from other serologists. In this manner, we have evolved a technic built upon the experience of others in addition to our own, embracing some original methods and a new antigen, which we hope will at least stimulate a proportion of serologists to give the method a trial and thereby aid in arriving at a conclusion regarding its status as an acceptable standard technic for the Wassermann reaction."

The outcome of this work is being awaited with much interest and hope for success.



## OBSTETRICS.

By EDWARD P. DAVIS, M.D.

**The Teaching of Obstetrics to Medical Students.**—Griffith<sup>1</sup> urges a thorough training in obstetrics for students of medicine. He believes that gynecology is so intimately bound up in obstetrics that any attempt to teach these as separate subjects is futile.

He will begin with the obstetric anatomy of the pelvis taught by the obstetrician. This should be followed by the physiology of the generative organs, and then should come the study of pregnancy. This should include the general structural changes in all parts of the body affected by pregnancy, as well as the special organs and their functions by which the symptoms and physical signs are recognizable in diagnosis. The general development of the ovum into the mature fetus, the growth of the placenta and other parts connected with the ovum should be studied. The minute details are not necessary. So-called morning sickness, the duration of pregnancy and the prediction of probable date of confinement, various positions of the fetus and the means of recognizing them should be included. After this should follow the discussion of the general principles and phenomena of labor, the duties of doctor and nurse in preparation for and during labor, anesthetics and other substitutes and drugs employed in labor, such as ergot and pituitrin. The study of the puerperium, including lactation, breast-feeding, care of the breasts, duties of doctor and nurse and the fee of doctor and nurse may then be considered. It is very important that pathology be thoroughly studied. The pathology of intra- and extra-uterine pregnancy, with the diagnosis and treatment, the pathology of labor, obstetric complications not only by methods applicable with skilled assistants, trained nurses and the most approved instruments available, but also under conditions where the attendant has to rely upon himself alone and upon simpler resources. The pathology of the puerperium in the young infant, including artificial feeding of the infant. The methods of teaching at our disposal comprise demonstration lectures, laboratory, museum and postmortem work, clinical work and teaching in wards and out-patient departments. It is obvious that all subjects involving diagnosis and treatment should be taught when the student is engaged in clinical work in obstetrics and gynecology, and this instruction should be preceded by the course in obstetric anatomy and the study of menstruation, normal pregnancy and labor. Before the student proceeds to practice obstetrics and gynecology he should have completed his course in these subjects, including pathology, with bacteriology.

<sup>1</sup> St. Bartholomew's Hospital Reports, February 8, 1919.

Long and wearisome lectures upon obstetrics are not the best method of teaching. On the other hand, good lectures, well illustrated by personal experience, are of great value to advanced students who have already been well grounded in the principles of the subject and have begun to obtain some experience of their own. Demonstration lectures, well illustrated with quiz, which helps to maintain the close attention of the student, are valuable, and enable the lecturer to discover whether the students are learning what they have been taught. In conducting quizzes and such exercises the writer suggests that students be selected from the back rows of benches in the lecture room, stating that these men are those whose modesty or fear of quizzes lead them to take a back seat. Although there are good text-books on obstetrics at the present time, lectures are better because they give the lecturer the opportunity for emphasizing and repeating points of fundamental importance, illustrating them from his own experience. The subjects which can well be taught in this way are the obstetric anatomy of the pelvis and its contents, menstruation, anatomy of pregnancy, of labor, of the puerperal period and the mechanism of labor, which should be taught with the fetus and not with the fetal skull only. The writer does not know of any manikin which is sufficiently flexible. The remainder of the subject of obstetrics should be taught by demonstration lectures, accompanying clinical work in the wards and out-patient rooms.

Out-patient obstetric work comprises two distinct departments: (1) the attendance of patients in their own homes by students, and (2) the attendance of pregnant women in the out-patient department of the hospital. If the student has been well instructed and has had experience in the conduct of labor in the lying-in wards, attendance on pregnant women in their own homes is valuable training. Whether the student does his work well or not will show the results obtained with patients. In addition to the scientific knowledge thus gained the student will have experience with domestic difficulties and social conditions among the poor, and should develop that sympathetic feeling for the troubles and privations of patients which is one of the finest points in the medical profession.

The student will obtain better training in this department if he is held personally responsible for the history and examination of patients. He should learn to make the correct diagnosis of pregnancy to ascertain the position of the fetus and the presentation, to measure the pelvis and compare the measurements on the living with those made at autopsy. He may encounter breech and other abnormal presentation and should learn the advantages of external version. Other complications will also come under his notice. He should learn to examine the breasts and ascertain what can be done to relieve conditions which may interfere with lactation. He should examine the urine, and in doubtful cases obtain a catheter specimen. He should also examine the vulva and vagina for evidence of infection and learn how to treat child and condition. He may in his work meet cases of chorea or early mental disease, but the latter he can scarcely appreciate unless he has clinical training in the asylum and there learns the principles of treatment. He should, above

all else, learn the value of the systematic examination of all women advanced in pregnancy. By being sure that all important details are normal before confinement, he should become forewarned of difficulties and possible complications.

The writer finds there are great difficulties in securing proper clinical training in obstetrics. He does not believe that an important branch like this can be properly taught in the out-patient department without effective supervision and without the aid of competent nurses. Hospital authorities provide, as a rule, far too few beds for maternity cases. The writer's experience of Queen Charlotte's Lying-in Hospital showed the advantage of proper facilities for clinical teaching. Classes contained not only students and postgraduates, but midwives and so-called monthly nurses, and the writer states that it would be difficult to determine who gained the most advantage from the mixed classes. He believes that this combined training is valuable in placing the relation of doctor and midwife or nurse on the footing of mutual friendly confidence which should exist. He believes that the next great improvement in the teaching of obstetrics will lie in the organization of maternity wards and hospitals in the great teaching centers fully equal to those now devoted to medicine and surgery. Under these conditions he believes that a three months' combined course in obstetrics and gynecology, with the whole time given to these subjects, would be sufficient to give an adequate education to the average student.

In the *British Medical Journal*, February 15, 1919, occurs an editorial upon this subject. Allusion is made to the discussion before the Royal Society of Medicine under the title of "Reconstruction of the Teaching of Obstetrics and Gynecology to the Medical Student." The editorial writer holds that it is impossible to divorce the subjects of obstetrics and gynecology in medical teaching.

In the present stage of medical evolution the preventive aspects of obstetrical and gynecological teaching are largely in the foreground. For this purpose Fairbairn's remarks described the association in one teaching hospital unit of a complete maternity center, a complete gynecological and a child-welfare center as ideal. Such an arrangement would undoubtedly enable the student to gain a comprehensive view of his responsibilities and to study in natural sequence the process of pregnancy and parturition and its ultimate results. There would be also a valuable influence in the sociological part of such an experience. This proposal also included the statement that the care of the infant up to nine months or a year should be given to the obstetrician. This the editorial writer is prepared to dispute. The majority of opinion was distinctly in favor of enlarging prenatal care and instruction as much as possible. The statement made by one speaker that supervision of pregnant mothers would produce no other result than raising up to maturity more unfit adults was vigorously challenged. There are numerous examples of conditions in which in one pregnancy the mother may be even critically ill and recovering from this, although she loses her offspring, may subsequently give birth to healthy children.

As regards actual methods of teaching the difficulties encountered in



the London and Edinburgh schools were much the same. While increased attention to the pregnant woman will diminish the frequency of unexpected obstetric emergencies, no previous care can prevent a placenta previa or an adherent placenta.

In the mind of the editorial writer, one or two conclusions seem justifiable. The teaching of obstetrics is so important that the subject must not be reduced to the level of a minor specialty. At least six months of the most thorough instruction is necessary for obstetrics and gynecology. Furthermore, the graduate should have a practical knowledge of obstetrics, and, at present, clinical teaching is left too much to junior members of hospital staffs, while the seniors are occupied with operating gynecology and the claims of private practice. For this, full time teachers are proposed, but the value of this proposal is open to question. Large endowments would be necessary to pay adequate salaries for such teachers, and such a teacher would lose considerable in not remaining in touch with the conditions of private practice. In discussion, the importance of research in connection with teaching was fully emphasized. Much of the technical work of research can be done by assistants, and the knowledge and experience of the chief of the department should be confined to inspiring, suggesting and guiding their work.

While better medical teaching is important, it is only part of the problem to be faced. The education and control of midwives, if such are permitted, is of great importance. Unless the public is educated to the necessity for proper teaching and adequate practice, a partial success only can be obtained.

The Royal Society of Medicine appointed a Committee of the Section on Obstetrics and Gynecology to inquire into the teaching of these subjects. This consisted of Eden, the chairman, and Andrews, Blacker, Fairbairn, McCann and Ley. Their report is given at considerable length in the *British Medical Journal*, August 30, September 13, 1919. While it will not be of special value to go into their report in detail, it shows the inadequacy of the hospital facilities available in London at the present time for the clinical teaching of obstetrics. Considerable space and material are given to the training of midwives, an element which in America we do not to any extent encourage. The report indicates that in this important subject additional facilities should be given for clinical work, and obstetrics and gynecology should be taught in one institute and in adjacent wards, so that the logical sequence of pregnancy, parturition and its results can be followed.

**Obstetrics Past, Present and Future.** Stookes<sup>2</sup> represents the old statistics of obstetric practice in Liverpool, showing that in the early days parturition must have been less complicated than at present, or else that its complications were not recognized. From 1828 to 1850 there were 4.5 deaths per thousand and 5.4 per cent. of stillbirths. This occurred in the Royal Maternity Charity. Matthews Duncan, in 1866, from the records of 31,277 cases from the private practice of the best-known obstetricians, collected 272 deaths, or 8.2 per 1000. This

<sup>2</sup> *British Medical Journal*, November 29, 1919.

he believed to be the average mortality of childbirth. At that time the mortality in hospital was much higher. In 1871, Florence Nightingale stated that childbirth in a hospital in London was four times more dangerous than in the towns of England where the mortality was 5 per 1000 births. Statistics seem to indicate that more cases of sepsis occur in women attended by physicians than by midwives. This is explained by the fact that midwives are forbidden to practice radical interference during labor, and that many of them are more careful in the practice of cleanliness than are some physicians. Recently obstetric surgery has been developing in the hospitals. Complicated cases are sent uniformly to hospitals, so that the records of these institutions show an average percentage of 37 of abnormal cases. Sepsis, in cases dealt with entirely in hospital, has almost disappeared. Results of Cesarean section steadily improve and its field extends. Prenatal care leads to the avoidance of many serious complications. The writer should like to see all women attended under hospital conditions and all labors conducted with the care and preparation that are given to any serious operation in surgery. He believes that at present the results of obstetric practice are unsatisfactory. The death-rate from childbirth, largely preventable, remains too high. There are too many injuries in labor and too many children are lost or injured. More adequate hospital accommodation is required. Obstetric practice, he thinks, is passing into the hands of midwives and specialists, and it is difficult to obtain adequate training for the average medical student.

**The Contributions of William Smellie to Obstetrics.** Thoms<sup>3</sup> has contributed an extensive paper upon this subject at the meeting of the Section on Obstetrics and Gynecology of the New York Academy of Medicine. His paper embraced not only the work of Smellie, but that of other early obstetricians. He states that up to the present day no obstetrical author, ancient or modern, has contributed so many principles of obstetric science as Smellie, a Scotsman born in 1697 and dying in 1763.

One of the early editions of his book was published in London in 1779, containing thirty-nine illustrations, each plate accompanied by a description. These illustrations are remarkably good as compared with modern ones. His teaching of the mechanism of labor was far in advance of his time and much of it is standard at the present day. Many in his time thought and believed that in labor the head of the child was situated anteroposteriorly in the brim of the pelvis, the face looking toward the sacrum and the occiput toward the pubis. Smellie recognized that this was impossible and appreciated the oblique position of the head in the oblique diameter as it passes through the brim. The fact that the longest diameter of the head must engage in the longest diameter of the pelvis was one of great importance. Prior to his time it was generally taught that the fetus was in breech presentation until after the seventh month, when it turned with the head downward. This error he corrected. He also disproved the fallacy that a living child helped in its birth and that

<sup>3</sup> American Journal of Obstetrics, August, 1919.

a dead child was born with more difficulty than one living. He showed that the fetus is passive so far as labor is concerned. He also corrected the common error that a child born at seven months is more likely to live than one born at eight. He pointed out the correct view concerning attachment of the placenta in the uterine cavity, and his method of delivering the placenta was a marked improvement of the general usage and embraced the modern principles of obstetric practice. When he first began to practice obstetrics his instruments consisted chiefly of perforating scissors and blunt hook, a file and a straight crochet. He procured a pair of French forceps and very considerably improved and modified them, and invented the so-called English lock. He devised not only the short but the long forceps and first made the perforating scissors which bear his name at the present time. The rules which he laid down for the safe application of forceps would receive endorsement at the present time.

In cases of posterior rotation of the occiput, he used manual rotation and also the forceps, and in these cases his straight forceps was often very useful. He was well acquainted with accidental hemorrhage and placenta praevia and paid special attention to the diseases and complications of the puerperal period. He recommended in practice the immediate surgical repair of laceration of the perineum. His obstetrical manikin is one of the best ever made. In addition to his technical knowledge, he strongly urged high standards of practice, and was a vigorous advocate of the universal acceptance of medical ethics.

**A Contribution of the French to Obstetric Science.** Barr<sup>4</sup> publishes a summary of the contributions of the French to obstetric science. In 1550, Paré placed podalic version upon a scientific basis. Rousset demonstrated the value of Cesarean section in 1581. The forceps, while invented in England, was made practical by Lebreton in 1747, and the pelvis was enlarged by an operation devised and performed by Sigault in 1768-1777. Baudelocque perfected scientific empiricism in 1829, and in the '80's Tarnier contributed his forceps, the basiotribe and the embryotome. While the Paris Academy of Medicine was discussing the alleged multiple causes of puerperal fever, on March 11, 1879, Pasteur declared that puerperal fever was caused by bacteria alone. When one person alleged that he did not expect to live to see this wonderful germ, Pasteur drew on the blackboard a streptococcus saying, "You have here the image of this germ."

The French have also done much in welfare work in pregnant women and nursing mothers and for young children. They have evolved the science of prophylactic obstetrics. In this way, shoulder presentation has practically disappeared and eclampsia is very rare. Budin established the first clinics for healthy babies and the first systematic prenatal care and instruction. Roussel put through a law for the protection of young infants, and this is no longer considered a charity but a State measure, vital for the preservation of the nation.

The most important question in obstetrics at present is the care of

<sup>4</sup> Archives Mensuelles d'Obstétrique et de Gynécologie, July, 1919.



working women during child-bearing, and here the French have made important advances.

**Repopulation.** Vitoux<sup>5</sup> presents a study of this important subject which now occupies so large a place in the affairs of nations. He quotes an extensive diminution in population in the years before the recent war and also during the war. In the four years of war, the birth-rate diminished almost one-half.

In the effort to check this tendency and bring about a healthy increase in the population the author lays considerable stress upon the repressing of information concerning the prevention of conception and the production of abortion. He also urges the establishment of suitable maternities with isolated rooms or wards where woman who wish to conceal their identity may be accommodated. He urges improvement in the food supply of parturient women, and the development of means for looking after their nutrition. He would also study those measures which are best adapted for the development of sound and healthy children, and also the protection of the infant in the first years of its life. There should be centers of information where pregnant women could be helped, a good milk supply, day nurseries and other agencies for caring for infants. Hospitals for infants should also be established. He would also establish dispensaries for infants where they could be properly cared for during the day and where mothers could be taught to take proper care of them. There should be medical inspection of schools and institutions where infants and children are housed, and measures should be taken to increase the nutrition of young children by furnishing proper food for them.

Physical education is also essential, every effort should be made to check tuberculosis, syphilis and alcoholism, and the question of housing of the population in view of its influence on successful reproduction must be kept in mind. The relief of those conditions which tend to prevent the birth and development of healthy children is a most important part of the general scheme. Every method should be taken to encourage rightful maternity, whether in the form of pensions, insurances or bounties. Evidently the question of woman suffrage has to do with the influence of women in securing proper laws, and their enactment would be very valuable.

**The Result of War upon the Child-bearing Function.** In the *British Medical Journal*, March 6, 1920, are quoted articles from Sweden and Austria, by Holmberg and Pinelles, describing the effect of war upon the reproductive function of women.

Amenorrhea in Sweden occurred in a large percentage of cases, probably because of the changed conditions of life from lack of nourishment and unusual work.

Throughout Germany and Austria failure of menstruation became pronounced in the autumn of 1916; this was equally common among all classes of society and was characterized by sudden cessation without any change in the character of menstruation. This cessation lasted

<sup>5</sup> Archives Mensuelles d'Obstétrique et de Gynécologie, May, 1919.

from two months to several years. Most of these patients complained of no symptoms, although a few had general fatigue, weakness and pains in the back and legs. Among those working in munition factories and those on night duty the conditions were especially bad. Physicians who treated clubs and societies found a very notable increase in this condition. Most physicians believe that it was caused by a disturbance of the internal secretion of the ovaries, which frequently result in atrophy of the uterus. Others ascribe it to the contamination of flour by various substances, among which was ergot. In Hippocrates's writings, epidemics are described of sterility or abortion among women occurring at a time when the crops of grain were spoiling through unusual conditions. Ergotism is the same rational explanation of these cases, and among these patients observed during wartime, the symptoms were those of tetany, such as cramps in the legs and paresthesia.

**Maternity Homes and Hospitals.** The Ministry of Health<sup>6</sup> of England published a memorandum on "Maternity Hospitals and Homes," illustrated by plans for buildings of various sizes, to provide from 8 to 120 beds.

The limit for a maternity home is put at from 6 to 20 beds, while maternity hospitals should have from 25 to 50 beds, or a greater number if required. Maternity homes are generally needed in smaller towns and rural districts, they are also required in the out-lying portions of large towns to supplement a maternity hospital. An ordinary dwelling can sometimes be converted into a maternity home for 6 to 8 patients, with fairly good results, but, when a larger number must be accommodated, it is difficult to obtain adequate sanitary equipment and facilities for isolation and separation. These homes should have an out-patient department to serve as a maternity center for the neighborhood, and also a center for district nursing, out-patient obstetric practice, and for the training of student and pupil nurses.

A maternity hospital should also become a center of the obstetric service and study of the town. This should be fully equipped for the treatment of all complications and disorders of pregnancy and labor, and for clinical teaching. They should provide for abnormal or difficult cases, but should also have accommodations for normal confinement. Each should have an out-patient department for the treatment of patients referred by doctors or midwives or those patients sent from prenatal clinics.

The medical staff of a maternity hospital must be competent to teach, as well as to conduct, the ordinary medical duties of the hospital. Such a hospital of 25 or 30 beds, admitting many abnormal cases, should have one or more residents as well as a visiting medical staff, and a pediatricist should be represented among the staff. A maternity home may not, as a rule, require a resident, but two or more practitioners having special experience in obstetrics should be available when needed. Normal confinements may be treated by the nurse-midwives on the staff unless the patient desires her own physician. It is suggested that one woman

<sup>6</sup> British Medical Journal, February 28, 1920.

doctor be associated with a maternity hospital or home whenever possible and that medical officers attached to a maternity home or hospital should have been a resident in an obstetric hospital.

Nursing under trained supervision is essential; a matron in charge of such an institution should be a trained nurse and experienced midwife, and nurses should be trained in general nursing as well as obstetrics, on the average of one nurse for every three mothers and their babies by day, and one nurse for eight to ten mothers and babies by night, will be needed. When pupil midwives are taken these numbers may vary.

Small homes as well as hospitals should have a room or ward for confinements to which is assigned a special staff of nurses. All maternity institutions should have a detached building for isolation or separation of suspicious cases. Puerperal septic cases should not be treated in ordinary isolation hospitals but should remain under the care of an obstetrician, both for the benefit of the patient and to afford means for study. As a smaller institution will not have the required staff and facilities for adequately treating septic cases they should be sent to the larger hospitals. All maternity hospitals should be fully equipped to deal with all complications of obstetrics.

A maternity home should be preferably secluded, with a garden, but centrally located and accessible. In towns the home should be distant from noise and traffic; in quiet and clean surroundings; not less than two acres is needed for a hospital of from 20 to 30 beds; for a home or hospital of 12 to 18 beds not less than one acre and a half. A detailed plan and description of a building for maternity home for 8 beds is appended.

In the matter of ventilation, when patients and infants are considered, 960 cubic feet per bed are thought necessary. When the room is to contain only mothers at night the area may be somewhat less, and in prenatal wards it may be still further reduced. An ordinary room or ward for confinement should not be less in size than 14 feet by 14 feet. Radiators or gas fires are thought to be better than coal fires. In every maternity home there should be a room available as an emergency for more than one labor.

**Studies in the Blood-controlling Apparatus of the Human Uterus.** Kieffer<sup>7</sup> reviews the literature of the subject and describes his own studies and investigations, which he illustrates. He believes it to be of special importance that the atony of the uterine arteries and their branches be clearly understood. He describes his methods of investigation, which include injection of specimens with staining material and also with metallic substances. His material was obtained from operative cases and by dissection. In a uterus, pregnant three months, injected with a metallic substance, he finds that the so-called circulatory arteries follow a generally perpendicular plane, as he expresses it, and illustrations point out different planes as to grouping in these vessels. Arteries seen in transverse section present a uniform wall circular in contour and a lumen of the same form. These investigations also show the connective tissue which is completely distinct from the muscular bundles and which

<sup>7</sup> Archives Mensuelles d. Obstétrique, July, 1919.



is found surrounding the vessels. The arteries are frequently grouped in two or three branches, dividing with the same caliber. In the vicinity of these arterial groups are found one or two vessels of different aspect; they are venous vessels, but it is difficult to determine their nature from their appearance, which varies greatly. Their total diameter is greater than that of surrounding vessels and a careful section reveals very irregular forms; the lumen of these vessels rarely represent the external appearance of the vessel. Contrary to that which is seen in the veins of other organs, the walls of these vessels vary greatly in thickness and seem to resemble those of arteries, the wall being formed with two layers of fibers, often entwined in opposing directions; each artery issues directly from one of the two principle uterine vessels, and these arteries are distributed by connective-tissue sheaths to the separate portions of the uterine tissue. These vessels are composed of two muscular tunics and one of endothelium, diminishing in caliber until the muscular arterial fibers are found in direct contact with the muscular or intravascular tissue of the uterine wall. These vessels become reduced in size to a layer of endothelium extending in the direction of surrounding tissue, in any such condition there is no longer an arterial system, but a capillary system in this portion of the uterus. A similar study has been made of the uterine veins and their relation to the muscular tissue. He has been able to trace a veritable sphincter to the uterine sinus through the formation of bundles of elastic tissue around the lumen of these vessels. Much of the uterine tissue is what may be termed erectal, as it may become surcharged with blood and in a condition of intense swelling. In addition to the sphincters of the vessels, he found vascular cavity in the uterine wall, where the blood remained momentarily in vasomotor pressure. He describes what he calls bulbs taking the place of valves, which can bring about the occlusion of afferent veins.

**Practical Points and Common Errors in the Treatment of Sterility.** In the *Journal of the American Medical Association*, October 11, 1919, Reynolds publishes an exceedingly valuable paper giving the results of his study and clinical work in this complicated subject.

He states that the many possibilities involved in sterility form so complicated a subject that very thorough study of all the factors in a given case is necessary to reach an accurate conclusion. Both husband and wife must be studied before a diagnosis can be made.

An examination of the couple should include a careful general life-history of both, especially directed toward detecting the existence of auto-intoxication or a past general infection involving the testicles or ovaries. This history should be followed by a general medical physical examination.

The sexual history of both husband and wife should be thoroughly investigated. In the man this should include past and present habits, the presence or absence of normal aptitude and the question of past infection. In the case of the women the events of puberty and the health in girlhood should be studied. Any changes in the history of menstruation and the phenomena of marital relations, especially when first assumed.

The local physical examination of the male should include the recognition of any abnormalities of the generative organs, the palpation of the testicles, prostatic urethra, the prostate gland and vesicles. If there is a history of past infection, or tenderness on palpation of the urethra, an examination of the urethra should be made.

In the pelvic examination of the woman the usual visual and bimanual examination should be followed by rectovaginal and abdominal palpation. This is made with the forefinger in the vagina, the second finger in the rectum and the other hand on the abdomen. Only those who have trained themselves to this method can appreciate the degree to which the shape and relation of the uterine body to the conditions of the ovaries can thus be determined. This method is essential in determining the existence of spasm in the so-called uterine ligaments composed of unstriated muscle forming a very important element in the examination for sterility. By this method, also, can be recognized functional derangements of the ovaries which can hardly be studied successfully in any other way. These examinations are especially valuable when conducted under anesthesia. For this purpose gas-oxygen is usually sufficient and unobjectionable.

By this method search should be made not only for the usual abnormalities, but every part of the genital organs, including size, shape, degree of development, tenderness, congestion, localized inflammatory conditions and spasms should thus be detected. If it is desired to study the lesser degrees of functional alteration in the ovaries this can sometimes best be done by repeating these examinations throughout the varying phases of the menstrual month. Microscopic examination of the secretions of both men and women should be made. Smears from the vaginal and cervical secretions and the chemical reactions and gross appearance of both should be recorded. Smears should be stained, and the bacteriology of the vagina and the amount and condition of the epithelial cells should be studied with especial reference to the degree of destruction of their cytoplasm. In the cervical secretion the amount and condition of the epithelial cells, the degree and quality of the leukocytosis and the thickness and tenacity of the mucus are all important.

In practice it is usually most convenient to make a postcoital examination of the woman to determine whether the spermatozoa are in the vagina, their abundance, degree of motility and vigor, and if this be done a direct microscopic examination of the male is unnecessary. This method is rarely accurate unless made within the first hour after coitus.

Next should come the examination of the mucus which escapes from the os uteri at this time. Specimens may be taken by a syringe or by other methods from the lower and upper cervix, and should be thoroughly examined, and the behavior of the spermatozoa within them should be accurately noted. In a few cases it is desirable to examine the secretion from the body of the uterus. It is difficult to obtain this without contamination of the cervical mucus, and there is some risk in invading the interior of the uterus. This method should be reserved for those cases in which the result of the previous examinations is not satisfactory.

If there is evidence that spermatozoa found in the vagina are not

vigorous, then an examination of the semen obtained directly from the male and without admixture with the secretions of the female should be made.

Experience has shown conclusively that no male should be condemned without examining a specimen obtained directly from the urethra by anyone of the three possible methods within a few minutes of the examination. Spermatozoa are exceedingly sensitive to cold, dryness and slight overheat, and, unless precautions are taken in this matter, an error may be made through the faulty method of collection for transmission of the specimen.

When these data have been accurately collected and are compared a fairly accurate prognosis of the prospect both with and without treatment may be obtained. The conditions involved, however, are so complex that opinions given without such analysis are little better than guesses.

It is especially important, in the case of sterility, that an accurate prognosis be made. The choice of the method of treatment, especially if the operation be included, requires a decision different in kind from that concerned with the relief of ill-health.

When the surgeon finds an abnormal condition, with distressing symptoms, and especially when danger to life is involved, he should urge upon his patients the importance of treatment whether it be minor or operative; but treatment for sterility only, with its attendant discomfort and expense, should be decided upon by the choice of the patients, especially in view of their desire for children and the hope which may be given of improvement in general health from the treatment. The decision will usually depend upon the prognosis which is given, and every effort should be made to give an accurate prognosis.

The profession frequently ask what degree of success may be obtained from the adequate treatment of sterility. In the present state of our knowledge a general statement is impossible, but with thorough study a fairly accurate prognosis may usually be obtained in a given case. The statistical study of all the cases seen has been attempted, but this has been unsatisfactory, owing to the character of the subject. There are so many possible causative elements in sterility; several such conditions are so frequently seen within the same case; the prognosis in individual cases varies so widely in accordance with the combinations of circumstances, and again varies so much with the duration of the sterility; the ages of the female patients and often with the results of previous treatment, that they have forgotten that an adequate classification of these cases for statistical analysis would require the use of many thousands of cases whose records had been carefully made, and such are not at present available. Again, conclusions from statistics without accurate classification would be misleading. While such conclusions drawn from cases selected as favorable would have little or no value. Among the most gratifying results obtained are those in which success follows the use of minor measures, but in this class of cases the causes of sterility are exceedingly variable and often grade into each other so minutely that their classification for adequate analysis of statistics has



proved at present hopeless. The only general statement about results so far worth putting into figures was obtained by treating as a whole the operative cases since present methods have been used, and in which two years have elapsed since operation. In this series, 70 consecutive cases yielded in general 42 per cent. of successes, but it must be stated that this collection included a number of cases in which the couple decided on operation after a bad prognosis about it had been given, and because they were willing to take even the smallest chance.

It is fair to say that in young persons without venereal history or serious congenital defects, and with sterility of but a few years' standing, the prospects of obtaining pregnancy under treatment is almost always very good. In selected cases it is as high as from 75 to 80 per cent. But in less favorable cases it may range all the way downward to those that are absolutely hopeless. Each couple then must be studied by themselves, and in this complicated condition no general statement of value can be made.

### PREGNANCY.

**The Duration of Gestation and the Reckoning of the Age of the Human Embryo.** Oliver<sup>s</sup> states that in studying the question of the duration of pregnancy and in reckoning the age of the human embryo it must be clearly borne in mind that pregnancy cannot occur in a woman who has never menstruated or who is incapable of menstruating, and that under ordinary circumstances menstruation ceases during uterogestation. It has long been assumed, on no scientific grounds, that gestation in woman extends over ten lunar months, or 280 days. Fertilization cannot take place during menstruation, but some authorities consider that the 280 days should be calculated not from the cessation but from the time of the appearance of the last menstrual discharge. Because, however, when the ovum is fertilized gestation begins at a definite time the methods of reckoning the probable date of confinement from the last menstrual period meets with a certain amount of success, owing largely to the fact that many women menstruate every twenty-four to twenty-eight days. When menstruation occurs every five or six weeks the present method of reckoning is very inaccurate; it is generally conceded that fertilization may take place at any time during the intra-menstrual period, that is, on the cessation of menstruation to two or three days prior to the expected period if at this time there is an increased determination of blood to the internal organs of generation. The writer in a previous article has drawn attention to the fact that we have the best reasons for believing that no matter when the ovum is fertilized, gestation begins during the two or three days preceding an expected menstruation. If we assume that the fertilization and starting of gestation are synchronous, then the gestation period fertilized immediately after gestation is longer than when fertilized four or five days before an expected period. There is no scientific or clinical proof of this fact. The phenomena seen in the germination of seeds and the incubation of

<sup>s</sup> British Medical Journal, March 22, 1919.

birds' eggs lead us to conclude that even in the case of a fertilized human ovum, fertilization and the beginning of pregnancy are not necessarily synchronous, except when fertilization happens when the internal organs of generation are about to prepare for the anticipated menstrual period. The writer believes that our present method of reckoning the duration of pregnancy is a tacit admission either that fertilization and the commencement of gestation are synchronous, and take place at a definite and fixed time in every case, or that while fertilization may take place at any time during the intramenstrual resting period, gestation itself begins in all cases at a definitely fixed time. The writer strongly believes that the latter is the correct interpretation.

**Biological Diagnosis of Pregnancy.** Barr and Eccle<sup>9</sup> publish a review of the bases, workings and diagnostic significance of the deviations of complement test, the Abderhalden method, intradermal reactions, changes in the antitryptic power of the serum and the behavior of cobra venom in the biologic diagnosis of pregnancy. They find that none of these tests give distinct results until so late in pregnancy that no such test is required. Their experience shows that although these researches have been numerous and difficult, the clinical benefit from them is very little and out of all proportion to the work involved. They examined 25 pregnant and 14 non-pregnant patients by the intradermal inoculation of placental peptone, with vague and uncertain results; but when the intradermal method was used with placental extract, analogous to the skin and intratuberculin tests, they obtained results which they think deserve further study. They believe that in future by these methods we shall better understand the mechanism of the rapid adaptation of the maternal organism to the development of the fetus, the symbiosis of mother and child, the anomalies in this symbiosis, and that this study will throw light upon the mechanism of immunity. Their reports are based upon tests made on nearly 400 pregnant and 100 non-pregnant patients. In 310 cases the Abderhalden method was employed and a negative response may be regarded as eliminating a developing pregnancy. The positive result, however, does not certify to a pregnancy, as this positive result may be obtained under other conditions. In over 100 certainly non-pregnant women, a positive result was found in 33 per cent.

**The Serum Diagnosis of Pregnancy.** Fleux and Mauriac<sup>10</sup> state that good results have been obtained in the diagnosis of pregnancy from the complement-deviation reaction. A preliminary test of antigens made from different placenta is first carried out, and by these the writer has found that chorionic villi of early ova from six to twelve weeks furnish good antigen with serum of pregnant women. But when placenta of from three or four months were used the results were variable, while placenta from the four to the nine months had no antigenic value. The villous masses of living ova of from two to three months were used in making antigen. These were prepared by washing in saline four or five minutes to get rid of blood, then by mixing a triturate to make a paste

<sup>9</sup> Archives Mensuelles d'Obstétrique et de Gynécologie, July, 1919.

<sup>10</sup> Gaz. hebdomadaire de médecine et de chirurgie, October 19, 1919.

which was dried on glass plates in a vacuum desiccator for sulphuric acid. This dried material was powdered and stored in the ice chest. When used a certain amount of this powder was carefully rubbed up in saline solution. This mixture, after being on ice twenty-four hours, was centrifuged and the supernatant fluid contained the antigens. Those antigens having a pink or reddish tint were rejected. The results are given in 33 tests, with 16 complete or almost complete deviations. All were cases of pregnancy. There were 14 frankly negative results, and among these there were at least 4 cases of pregnancy. The other three results were doubtful, all being from pregnant women. In one series of 48 there were 19 positive results and 23 negative, of which 13 were certainly cases of pregnancy and the rest other uterine conditions. There were 6 doubtful results, of which 3 were pregnant. The writers state that they have never had a frankly positive result in the non-pregnant case. Nor have they had a frankly positive result with serum from pregnancies later than the fifth month or in the case of a dead fetus. They realize fully the fact that they have no large number of cases to present, and their statements are exceedingly conservative.

**Mistaking of Pregnancy for Tumor.** This matter was brought to a legal test in a recent suit in North Carolina,<sup>11</sup> in which the Supreme Court gave an opinion. The Lower Court had given a judgment in favor of the defendants who were charged with malpractice in diagnosing a case of pregnancy as one of tumor. The Supreme Court affirms the judgment of the Lower Court, stating that according to the defendants it was very difficult to determine the woman's true condition. Indications pointed to the presence of an ovarian cyst, but the true condition could not be ascertained without an exploratory operation, and such was performed. The woman, aged forty-seven years, married, had given birth to three children at intervals of three and two years, the last having been born twelve years before her visit January 8, 1917, to the physician who was the defendant. From the birth of the last child until the last of August, 1916, she menstruated regularly. About September 21, 1916, she noticed the first irregularity, menstruation being partially suppressed and continuing with a slight, but constant flow, with periods of one or two days without flow. With the exception of one week, this continued until January 8, 1917, and up to this time she had observed no signs of pregnancy, but stated to her physician that she thought that she had a tumor. The abdomen was apparently enlarged. Without coming to a definite conclusion the physician advised the patient to consult the other defendant regarding an operation. Two examinations were made and a probable diagnosis of submucous fibroid, or possible cyst, was made; but it was stated that the diagnosis could not be certain and an exploratory operation was considered justifiable. When the abdomen was opened the woman was found to be normally pregnant and there was no indication of tumor. The wound was closed, the patient recovered and was delivered of a child at normal term without accident or injury. Much evidence was taken at the trial bearing on the question of negli-

<sup>11</sup> Journal of the American Medical Association, December 6, 1919.



gence and damage regarding the behavior of the two defendants, the jury giving a verdict that the plaintiffs were not injured by the negligence or want of skill of the defendants.

In reviewing the case the Court discussed the duties and responsibilities of the physician and surgeon in diagnosis and treatment, and stated that a physician qualified to practice, who applies his skill and judgment with due care, is not ordinarily liable for damages following an honest mistake or error in judgment in making a diagnosis, prescribing treatment or determining on operation. When a reasonable doubt exists as to the nature of the physical conditions involved or as to what should have been done in accordance with recognized authority and good current practice. Whether error of judgment will or will not make a physician liable in a case depends not only upon the fact that he may be ordinarily skilful as such, but whether he has treated the case carefully and has employed such reasonable skill and diligence as are ordinarily exercised by his profession. A fundamental difference exists in malpractice cases between mere errors of judgment and negligence in previously collecting data essential to the proper conclusion or a satisfactory conduct in the selection and use of instrumentalities with which the physician may execute his judgment. If he negligently omits to inform himself as to the facts and circumstances and injury results therefrom, then he is liable. Whether the fetus was quick with life so that the beat of the heart could be detected by examination was a question of fact for the jury to determine on the evidence, as were the other questions involved. Regarding expert testimony, it was held competent to ask an expert witness whether, in his opinion, on the facts stated in the hypothetical questions if found by the jury on the evidence the diagnosis was made according to the approved practice and principles of the medical profession. It is not the part of the expert to draw inferences of fact from the evidence but simply to declare his opinion on a known admitted set of facts or on a hypothetical case. The rule is that the expert must base his opinion on the supposition that the jury will find the facts recited in the hypothetical question, and there must be evidence of these facts.

**Superfetation with Complications.** The interesting question of superfetation receives illustration in a case reported by Long.<sup>12</sup> The mother had been attended by a midwife. With complications arising, Long was called in. He found a healthy-looking, female child, apparently at full term, born some one and a half hours previously, an empty bag of membranes and another bag of membranes, in which was a fetus about three months' gestation, showing no signs of decomposition. The two cords from the child and fetus were passing into the vulva where no placenta had yet been born. There seemed no sign of natural delivery of the after-birth and the patient was given light chloroform anesthesia, and under aseptic precautions a gloved right hand was introduced into the uterus. The placenta was very adherent and with difficulty was peeled off and withdrawn. It was then observed that the cord of the

<sup>12</sup> British Medical Journal, September 27, 1919.

fetus was not attached to the first placenta and the second placenta was soon found, but the uterus had contracted, forming a contracted ring above which the placenta was firmly adherent. This was removed with great difficulty and the placenta was soon born. There was severe hemorrhage controlled by pituitrin and enrutin, with hot douching and manual compression of the wall of the uterus. The patient was in the kitchen of a crowded cottage and the surroundings were unfavorable. Under stimulation the patient rallied. Sepsis developed and the patient died, with a very low and subnormal temperature, about eight days later.

There are a number of interesting points in connection with this case. Superfetation seems to have been present, in view of the difference of development of the children and the separate cords and placentæ. If such were not the case, then a twin pregnancy, with early death of one fetus without decomposition, may be thought to explain the phenomena. The formation of the contraction ring is of interest and also the premature birth of the membranes of the living child.

In the observation of the reviewer, twin children have been born where one was living and one was dead. There was but one placenta, half of which had undergone extensive thrombosis, and from this half the twin that died had originally been nourished. The other half of the placenta was normal and so was its twin. There was no twisting or coiling of the cords, so that some change in the bloodvessels of half of the placenta must account for the death of the child. No explanation of gross anatomical study could be found for this condition. If superfetation be admitted, it may occur at any period of gestation, for while it is usual to have the membranes close early in pregnancy there is evidence that bacteria and spermatozoa can make their way into the uterus at any time during gestation.

**Fetal and Maternal Athyrosis.** In the *Journal of Endocrinology*, July to September, 1919, Smith publishes a paper in which he maintains that during pregnancy disorders of the teeth, nails and hair indicate a rather general development of more or less severe maternal athyrosis. In pregnancy, the prophylactic enzymes increase in the blood and tend to produce a condition resembling that in which fetal and maternal athyrosis develops in the domestic animals. This can scarcely be said to be a pronounced pathologic state, but a condition which requires an abundant supply of iodine. We recall the fact that some cases of the toxemia of pregnancy may be traced to derangements of the functions of the thyroid gland, and that many of these patients are improved by an abundant supply of iodine. When a milk diet exclusively is prescribed for the toxemic and pregnant woman, care must be taken to supply iodine abundantly or the fetus may suffer from the restricted diet. When either of the parents has thyroid disease, iodine should be given abundantly in addition to ordinary diet, and very probably this should also be done when the pathologic state present is a disturbance of the parathyroids. If a thyroid is to perform its functions normally,  $\frac{1}{2}$  to 1 grain of iodine, in addition to the ordinary diet should be given daily during pregnancy and menstruation, and for a week each month in patients at the stage of puberty in the early months of the year.

**The Influence of Pregnancy on Diseases of the Heart, Lung and Kidney.** Hüssy<sup>13</sup> has studied the records of 15,353 parturient women delivered in the Basel Women in ten years. Of these, 35 had heart disease, 9 per cent. of whom died at delivery and 18 per cent. not long after. In 40 per cent. pregnancy had aggravated the disease, while only 50 per cent. did well during pregnancy and labor. In 17 per cent. the diseased condition was made worse by pregnancy and interruption of gestation had to be practised. There were 76 cases of manifest tuberculosis of the lungs. Of these, 6 per cent. died in labor and 10 per cent. soon after. Seventeen per cent. had the condition much aggravated during pregnancy, but 66 per cent. went through gestation without apparent harm. Of 15 women with chronic nephritis, one-fifth or 3, died in labor and only 43 per cent. passed through the pregnancy without injury from disease of the kidneys. Mitral stenosis was especially deadly, very few women surviving pregnancy, some dying before delivery. Latent pulmonary tuberculosis was apparently not much influenced by pregnancy, and even in plain and bad cases the condition of the patient seemed to improve. A few years after labor patients having pulmonary tuberculosis often died. The tubercle bacilli seemed to become disseminated through the body at the time of delivery of the child. Pregnancy itself does not seem to be a very exciting cause. When patients had chronic nephritis, the primary mortality was high, although they too seemed to improve after the baby was born.

**The Pelvic Articulations during Pregnancy, Labor and the Puerperal State.** Lynch<sup>14</sup> stated that it had been proved that changes in the pelvic joints greatly aided labor in some of the animals. In 1912, it had been shown that the pelvis of the female guinea-pig was only about half the size of the fetal head and that labor was made possible by an increase in the size of the pelvis, since the head measured 20 mm. and the pelvis 11 mm. Three weeks before parturition the pubic ligaments become thick, soft and elastic, so that the pubis opened, the ilia rotating on the iliosacral joints as if on a hinge. A separation of from one to two fingers' breadth appeared at the time of labor. This disappeared in a few days. The same thing had been observed in the seal during pregnancy to the extent of nearly two inches. In the parturient cow the joints of the pelvis became very elastic, greatly increasing its size, and specimens illustrating this were shown by Duncan before the Edinburgh Obstetrical Society. The pubis remained fairly tight while the sacro-iliac joints are considerably loosened. In the non-pregnant animal these joints are firmly united by a substance resembling intervertebral disks. During pregnancy the surfaces of the bones become smooth and lubricated and the ligaments relax greatly. The sacrosciatic ligaments were greatly elongated and thickened in the pregnant cow, and this permitted the sacrum to move freely on the ilium, and this motion in the antero-posterior direction permitted the ilia to separate widely behind. Those who have observed cattle have recognized the change in the shape of the pregnant cow shortly before labor.

<sup>13</sup> Correspondenz-Blatt für schweizer Aerzte, July 31, 1919.

<sup>14</sup> American Journal of Obstetrics, September, 1919.



Hippocrates taught that the pelvis of woman separates in her first labor and does not return to its original condition. This was disputed by Vesalius and others, who taught that the human female pelvis was an unyielding ring. In 1599, Pineau described separation in the pubis of a woman who was executed ten days after labor for the murder of her child. The autopsy was made in the presence of Ambrose Paré, and proved that the older doctrine was correct.

Vaodelocque admitted that the pelvis separated, but thought that this was exceptional, for he could not demonstrate it in the bodies of twenty women who died during labor.

There are on record a sufficient number of cases of pelvic separation to illustrate its mechanism. The earlier anatomists and William Hunter showed that in parturient women a symphysis developed a membrane from the articulation which contained fluid. Later this was asserted regarding other pelvic joints. In 1854, Luschka contrasted the pelvic joints of two women of twenty-one, one of whom was not pregnant and the other recently delivered, and added a report on an autopsy on the woman of thirty-six who died late in a third pregnancy.

Duncan's essay in 1867 showed that the sacrum normally rotates on the transverse diameter. This occurs to some extent in both men and women standing, the body weight pushing the promontory back, increasing the length of the true conjugate. When an individual squats, the promontory is pushed forward, the coccyx backward, thus increasing the diameter of the outlet. During pregnancy the pelvic joints soften, greatly increasing the movements of the sacrum. It is thus best for women in the first stage of labor to walk about to increase the inlet while the head is still high. When the presenting part reaches the pelvic floor reflexes cause parturient patients to draw up their knees and press down. The contracting abdominal muscles pull the pubis up and increase the outlet. The patient often separated her feet widely in labor and thus took advantage of any separation of the pubis. His essay explained the value of Mercurio's position, which was in use many centuries before its description by Waleher.

Boudin and Cantin had made extensive observations of these phenomena, showing the amount of separation in a series of 500 cases. In 98 per cent. the joints in the pregnant woman are much more movable than in the non-pregnant. The separation of the pubis was but slight, 3 mm., and in only 16 per cent. was it more than 1 mm. Seventy per cent. of these patients changed their gait in walking and 15 per cent. complained of symptoms. Lynch has studied the subject with the x-ray and has been especially interested in a case of rupture of the symphysis during labor, which he saw three years later, during her second pregnancy, when the patient had well-marked symptoms. One of these patients had well-marked separation of the symphysis during pregnancy, which disappeared during fifteen months after delivery. He believed that the sacrosciatic spaces were frequently widened. In discussion, Litzenberg had studied 1000 cases of pregnancy, among whom 96 required treatment because of looseness of the pelvic joints. It was suggested that pregnant patients should be examined by x-ray, and that

if separation of the joints was found this condition might be utilized in the management of labor.

**Normal, Plus Extra-uterine, Pregnancy.** Fenger<sup>15</sup> believes that intra- and extra-uterine pregnancy rarely occur at the same time. The diagnosis in these cases is often obscure, and in a series of 169 quoted by Neugebauer a diagnosis of incarcerated retroflexion had been made in six. In 3 of the cases an attempt was made to correct the displacement, which proved fatal. In 127 of the cases operation was done for rupture, and in the majority the pregnancy in the uterus was not discovered and the condition of the womb was thought to be the result of a tubal pregnancy. Usually after operation on the tube, the uterus expels its contents. In the case described by Fenger, section had been done for ruptured tubal pregnancy; eleven days later phlebitis developed and the fetus was found in the vagina. In 70 cases, the pregnancy was interrupted in 62. In 40 cases the contents of the uterus was first expelled and the extra-uterine pregnancy was not discovered. About one-fourth of these patients were not properly operated upon and the tube ruptured and death occurred. Apparently this resulted from the shock of an abortion and happened within an hour. Very frequently the ectopic pregnancy was unsuspected until the abdomen was opened. Of the 169 cases, there were 42 in which both the pregnancies went to seven months or beyond. In 4 patients both the children survived, one being delivered in the usual way and the other by section. In 10, the ectopic fetus was born through a fistula. Among the most dangerous of the conditions present in these cases was rapid intraperitoneal hemorrhage. It is very important that obstetricians should remember that normal and ectopic pregnancy can exist at the same time. In a very small proportion only was the condition recognized even at operation.

**Pregnancy Complicated by Rupture of an Ovarian Cyst.** Ferguson<sup>16</sup> reports the case of a multipara who during the eight months of her pregnancy had been much larger than in her previous gestations. Eight weeks before she was seen she had acute pain in the right side and rapidly increasing distention of the abdomen. She was then unable to walk and advised to remain in bed. On examining the abdomen, it evidently contained fluid, but nothing more could be made out. The action of the mother's heart was good. Her urine was freely secreted and was normal. The abdomen was tapped to relieve pressure and 16 gallons of fluid, which resembled that of an ovarian cyst, were withdrawn. The uterus could be made out on the left side of the abdomen and eight months pregnant. The right side of the abdomen was occupied by a cystic swelling which could not be displaced. A week later the abdomen was opened by an excision extending along the right side of the rectus muscle. A large multilocular cyst of the left ovary was found, with twisted pedicle lying between the uterus and the promontory of the sacrum. The tear was discovered in the outer wall where the cyst had ruptured. The tumor and its contents weighed, after removal, seventeen pounds. The patient recovered from the operation without interruption and subsequently gave birth spontaneously to a full-time living child.

<sup>15</sup> Hospitalstidende, Copenhagen, October 1, 1919.

<sup>16</sup> British Medical Journal, August 2, 1919.

**Cerebral Hemorrhage Complicating Pregnancy.** Langrock<sup>17</sup> describes a case of a primipara, twenty-three years old, who had a convulsion and fell unconscious to the floor. She was admitted to the hospital with a diagnosis of eclampsia, her systolic pressure was 180, diastolic 120, pulse-rate 54. She had Cheyne-Stokes breathing and respiration very poor. Only a few drops of highly colored urine were obtained by catheter. There was marked edema of the ankles and slight edema of the legs. The whole right side of the body was extremely spastic and also the left lower extremity. The neck was slightly rigid. The left pupil was widely dilated; the right was pin-point and only reacted to light. There was no corneal reflex. Babinski sign was present on both sides and also exaggerated knee-jerks. There were moist rales throughout the lungs and the heart sounds were feeble and very irregular.

On examining the abdomen, there was an eight and a half months uterus with a floating head of the fetus. The fetal heart sounds were good, heard in the left lower quadrant, rate 148. On vaginal examination the cervix was found two finger-widths dilated, soft and thin, the membranes unbroken. A diagnosis of eclampsia and intracranial pressure was made, the latter evidenced by unequal pupils which did not react, slow pulse, Cheyne-Stokes breathing, spasticity and the Babinski reflex. It was thought that the pressure might have been caused by a cerebral hemorrhage complicating eclampsia or intracranial injury, caused by the patient's fall to the floor following the apparently eclamptic convulsion or to a cerebral hemorrhage from the rupture of a syphilitic bloodvessel. The patient gradually failed and died, and a postmortem abdominal Cesarean section was done, with the delivery of a living child, weight 6 pounds 14 ounces. The baby was resuscitated without much difficulty and left the hospital three weeks later in good condition.

At autopsy there was a most extensive hemorrhage in the brain, the ventricles being filled with blood. The vessels at the base of the brain were hypoplastic. The heart was small and the aorta not of normal caliber; the abdominal aorta was about as large as the little finger and the whole cardiovascular system showed distinct hypoplasia, together with this and other features a diagnosis of status lymphaticus was made. It is well known that in this class of cases sudden death by cerebral hemorrhage is not uncommon. The liver and kidneys gave no evidence microscopically or macroscopically, of toxemia.

**Two Cases of Phantom Pregnancy.** Wulff<sup>18</sup> reported 2 cases in which amenorrhea had been present for several months; they had been examined by physicians and sent to the maternity at Copenhagen as pregnant and it was thought that heart sounds had been heard. One patient was later transferred to the clinical service of another hospital, having pains which had been observed by the writer and other physicians. The other patient was admitted to the hospital for the production of abortion at the fifth month and had been examined by several physicians. One case turned out to be retention of urine and the palpation of the full urinary bladder had obscured the diagnosis. The patient's amenorrhea had

<sup>17</sup> American Journal of Obstetrics, March, 1919.

<sup>18</sup> Ugeskrift for Læger No. 14, 1919.



resulted from profound anemia and malnutrition. The retention of urine was produced by acute gonorrhea. Neither one of these cases was hysterical. In one of these cases there was great abdominal distention with gas, and in this the flatulence and eructations suggested the condition. It is not difficult to believe that one finds fetal parts and fetal movements on palpating the abdomen; these may be fibroids of the uterus and fetal movements may be confused with contractions of the abdominal muscles. It is more often we find phantom pregnancy in women who greatly desire children, and especially are approaching the menopause without having their desires gratified.

**The Result of Disease of the Heart, Lungs and Kidney after Pregnancy.** Hussy<sup>19</sup> states that of 15,452 women delivered at the Women's Hospital at Basel in ten years, 35 had heart disease, of whom 9 per cent. died during labor, and not long after 18 per cent. In 40 per cent. pregnancy had aggravated the disease and only 50 per cent. endured pregnancy and delivery without apparent harm.

During pregnancy the condition became aggravated in 17 per cent. and the patient grew so much worse that pregnancy had to be terminated. There were 76 patients with pulmonary tuberculosis complicating pregnancy; of these, 6 per cent. died at delivery and 10 per cent. soon after. Pregnancy aggravated the condition in 17 per cent., but two-thirds, or 66 per cent. seemed to be unharmed by pregnancy, although among these 8 per cent. were worse during labor. There were 15 cases of chronic nephritis, of whom 20 per cent. died in labor and only 49 per cent. seemed to escape aggravation of the kidney disease by the pregnancy. Of women having mitral stenosis, very few, he states, survived pregnancy, and some of them died before the birth of the child. Latent pulmonary tuberculosis resisted the effects of pregnancy, and some of these patients seemed to grow better. A few years afterward, however, many of them died from a rapid increase in the disease, caused by the rapid and extensive growth of the bacilli at the time of delivery. It does not seem to be so much the pregnancy as the labor which makes them worse, while many patients with chronic nephritis grew better after the birth of the child.

The reviewer has recently had considerable experience with tubercular women in various stages of pregnancy. Many of them were anemic multiplare in whom pregnancy was terminated to enable the mother to better resist the tubercular condition. Whenever the condition of the patient justified it and permission could be obtained, pregnancy was terminated by hysterectomy to sterilize the woman. This operation has proved surprisingly successful, and some patients seemed to improve in general health immediately after the operation. A distinction must be made between pregnant women who become tubercular and tubercular women who become pregnant. With good care the pregnant woman who becomes tubercular may be helped to resist the infection and may do well. Pregnancy need not be interrupted nor need the child suffer, on the other hand tubercular women who become pregnant do badly during

<sup>19</sup> Correspondenz-Blatt für schweizer Aerzte, July 31, 1919.

pregnancy, although in some instances there seems to be a stimulus to resistance occasioned by the pregnancy as soon as the child is delivered; however, most of these grow worse with great rapidity.

**The Renal Affections Associated with Pregnancy.** Parmenter,<sup>20</sup> in pregnant patients, does not consider the kidney as the site of the primary infection. He believes that acute or chronic septic processes arising in some portion of the body other than the kidneys, as in the teeth, tonsils, sinuses, intestines, gall-bladder, appendix, pelyis and leg ulcers may cause in pregnant patients diseased condition of the kidneys. Bacteria, bacterial toxins and other products of inflammation which reach the kidney through the blood stream, the lymphatics or ureters may also cause diseased conditions of the kidney. The bactericidal powers of the cells of the convoluted tubules, the transient nature of the infection and the comparatively low virulence of the bacteria may prevent injury by bacteria to the renal parenchyma. Thus any factor which lowers the resistance of the renal parenchyma to infection, such as trauma, previous damage from infection, calculous obstruction of the ureter, when the kidney suffers from mechanical blocking and the retention of urine, may tend to the production of damage to the kidney. Kidney infections during pregnancy may be divided into two classes: (1) bacteriuria, and (2) pyelonephritis. The diagnosis of bacteriuria is made by finding bacteria in the urine taken from the ureters when pus is absent. The symptoms may be entirely absent, or if they are present they may be confined entirely to the urinary apparatus. In pyelonephritis, whether acute or chronic, there are general, local or urinary symptoms. The general symptoms are those common to infection, weakness, rigors, increase in pulse and temperature and leukocytosis. The local symptoms are those found in any abdominal infection. The urinary symptoms are usually referred to the bladder, with frequency and urgency in urination, tenesmus and the frequent passage of small quantities of turbid urine. It is rare to have symptoms of renal colic. Both general and local symptoms depend upon the severity of the infection and the lack of drainage, while the urinary symptoms indicate the establishment of at least partial drainage.

Pyelonephritis is diagnosticated by the history and physical examination, with a careful search for foci of infection and thorough urological tests. The urine should be subjected separately to chemical, bacterial and microscopic examination. An estimation of the function of the kidney should be made and a pyelographic outline of the renal pelvis should be obtained by the  $x$ -ray. When infection proceeds from cocci, the condition is more severe and nephrectomy may be necessary.

Aside from nephrectomy, the case may be treated by removing the source of infection whenever possible. Any obstruction to the discharge of urine should be removed in order to limit the spread and virulence of the infection. The pregnant woman in the knee-chest posture and the catheterization of the ureters are indicated. While stricture of the urethra is rare in women, contraction of the meatus is sometimes present

<sup>20</sup> New York Medical Journal, 1919, cix, 1080.

and may be relieved by dilatation. Every means should be used to increase the resisting power of the patient, and early in pregnancy the chronic foci should be abolished, especially if the urine is not normal. When the patient comes into labor, as little interference as possible should be practised to prevent an ascending lymphatic infection. The use of the catheter should be avoided unless absolutely necessary, but, if it is used, an ounce of citrate and boric solution should be left in the bladder as an antiseptic.

**Glycosuria in Pregnancy.** In the *Journal of the Canadian Medical Association*, August, 1919, Cameron reports 5 cases of glycosuria in a series of 468 pregnancies and adds 3 cases from the practice of others.

In his first case there was a small amount of reducing sugar present in the fifth month, but this cleared up after the sixth month. It was thought that a transient lactosuria was present, but no qualitative examination was made to confirm this opinion. Labor was prolonged and nearly two ounces of chloroform was used. She recovered without complications and went into the country to recuperate. A week later she developed an abnormal appetite and died in diabetic coma three weeks after this. In the other cases very careful qualitative examinations were made and glucose was undoubtedly present in the form of sugar. True diabetes was found in 2 of these patients. In the first case it is thought that labor may have something to do with the development of diabetes and exerted a greater influence than the chloroform, while the latter may have brought about an acidosis which precipitated the final issue. The use of chloroform in such a case is greatly to be regretted. The disappearance of the glycosuria during the latter part of pregnancy may be explained by assuming that diabetes of pancreatic origin was present before pregnancy began and that the fetal pancreas served for both mother and child until delivery occurred, when labor made a demand upon the metabolism of the mother which could not be satisfied in the absence of the fetal pancreas. This theory would also account for the fact that some patients having diabetes improve during pregnancy. We know that gestation produces hyperplasia in the pituitary body and that this has to do with the growth of the fetus, and, as the posterior lobe is affected, it results in decreased tolerance of carbohydrates, and this may develop into glycosuria. The reduction of copper hydroxide by the urine of a pregnant patient may indicate lactosuria, which is of no serious importance, and the fullest test should be made to be sure that glycosuria is absent, or if it does exist, true diabetes may be present or just about to develop. If the glycosuria can be controlled by diet, frequent examinations of the urine may efficiently protect the patient during pregnancy; but such examinations will not decide whether diabetes is under control because of fetal hormones, and it will also not distinguish between glycosuria due to overfeeding or secretion of inverted lactose. The only positive means of diagnosis consists in estimating the sugar in the blood.

**Pregnancy and Tuberculosis.** At the Thirtieth Congress of the Italian Society of Obstetrics and Gynecology, Rome, January 26-28, 1919, one of the important questions considered was tuberculosis in its



relation to pregnancy and infantile infection, Mangalli presented a report upon this subject. He urged that pregnant women who are tuberculous should be isolated. There should be in large hospitals special wards for them, and in small maternities they should have separate rooms. This in the interest not only of the sick woman, but of her family. There must be coördinate work between the dispensaries for the treatment of tuberculosis and maternities, and both should coöperate in securing the better health of the patients. The former view that pregnancy exerts an unfavorable influence upon tuberculosis is proved from every standpoint. It does not, however, follow that in every case of pregnancy and tuberculosis that pregnancy should be interrupted. The biologic reactions in a given case are not sufficiently accurate to furnish a reason for the interruption of pregnancy.

One must determine upon this point when the tuberculous woman has had repeated pregnancies in a comparatively short time. One must also take into account the period of gestation and a just and equitable balance between the life of the mother and the fetus. As a general rule it cannot be proved that removal of the ovaries and uterus exercises especially favorable influence upon tuberculous patients. Sanitarium life does not give the favorable results that one would expect. Labor itself may be spontaneous or induced. The delivery of the child usually occurs normally, and infants born of tuberculous mothers are frequently well developed and apparently robust. While the heredity of tuberculosis cannot be demonstrated so far as the child is concerned, one must depend upon the doctrine of contagion in acting in the interests of the infant. There is a great field for prophylaxis in preventing the spread of tuberculosis from mother to child. This has been clearly shown in clinical experience in Milan. Infants are given to wet-nurses whose children are dead or they have been nursed at least for three months. In the clinic devoted to infants there is a special ward for these children for whom wet-nurses cannot be found. A special medical commission has been at work upon this subject in Milan, with good results. In the second year of the children's lives they are sent to special wards and asylums established by philanthropic persons, containing about 170 beds, where they can be kept until seven years old and where they are carefully taught. After this they are sent to houses in the country, taught to lead a healthy life out-of-doors and every effort is made to avoid the danger incident to city and town life. If they are taken ill, they are brought back to the clinic service for children. If they become orphans, they are sent to a well-conducted orphanage. The work of protecting infants against tubercular infection, which was begun at Milan some years before the same work was taken up in Paris, takes the children from the moment of birth from a tuberculous mother and looks after the child until it is capable of doing some useful work.

In discussion, Major White, of the Medical Service, Director in the American Red Cross in Italy, after a study of tuberculosis, stated that in America the same principles of treatment had been successfully carried out. An executive secretary for each committee had been employed under the direction of a Special Council to find the most efficacious

means for combating the disease. He is responsible not only for the finances of the work but also for the success of the committee. Dispensaries for the fight against tuberculosis have been greatly increased, visiting nurses have been employed who give instruction in the houses of patients, find cases of tuberculosis and secure for them medical help, and, whenever possible, bring them to hospital wards. As the result of this work infantile mortality had diminished to 50 in 100 cases. This work had become one of great importance and was capable of almost indefinite expansion in the various branches of health which become connected with the welfare of the child. The speaker urged that as in war time the nations employed concerted effort to maintain the health of the population under the stress of combat, so in peace there should be the same concerted effort to combat disease, and especially tuberculosis.

**Influenza during Pregnancy.** Grillet<sup>21</sup> describes 4 cases of pregnancy under six months having severe influenza resulting in abortion, followed by death in forty-eight hours. There were 37 cases beyond six months in which 2 died before the birth of the child. In 15 cases with pneumonia or bronchopneumonia, a dead fetus was born at premature labor and 34 of these women grew rapidly worse after delivery and died; 25 gave birth to a living child, but mother and child survived in only nine. Infection of the uterus developed in none of these patients. Labor was comparatively short and death resulted from influenza. There were 22 cases of women at full term, of whom one-half died. The fate of the children depended upon the severity of the infection in each individual case. If influenza did not develop until the labor, the child usually escaped infection, but, if influenza developed some time before confinement, the child usually died before labor.

**Appendicitis in Pregnancy.** Hoffmann<sup>22</sup> contributes a paper upon this subject illustrated by *x-ray* photographs and detailed clinical histories. As a result of his observation at operation and from *x-ray* studies he concludes that during the latter months of pregnancy the cecum and appendix are carried up almost to the border of the ribs by the pressure of the uterus. Under the right side of the growing uterus the Fallopian tube lies beneath the appendix, with its fimbriated extremity oftentimes included in an adhesion. The right round ligament was also in practically this same location. He does not believe that in all cases the cecum is carried high up, but in many patients in the early months of pregnancy it is forced backward to the side of the abdomen toward the spinal column. The position of the appendix will depend somewhat upon the condition of the abdominal wall of the patient. In primiparæ whose tissues are firm and elastic, there is greater pressure on the abdominal contents, and hence the cecum and appendix may be carried much further than the usual location. These facts render the diagnosis of appendicitis in pregnancy somewhat difficult and also increases the difficulty of operation. Whenever possible, he believes that barium should be given and an *x-ray* picture taken before operation,

<sup>21</sup> Jour. de méd., January 10, 1920.

<sup>22</sup> Archives f. Gynäkologie, 1920, cxii, 230.

unless the case is one of emergency. He recognizes the fact that operation in the early months of pregnancy is much more feasible and successful than in the last months.

His clinical conclusions are of value and his illustrations add much to the importance of the paper.

**Abdominal Total Extirpation of the Pregnant Uterus for Pulmonary Tuberculosis.** Zacharias<sup>23</sup> urges the value of complete removal of the uterus and adnexa for pulmonary tuberculosis. He reports 11 cases in the Dresden clinic. There was no mortality in his series and the patients suffered from tubercular infection of the lungs and larynx and were in the first half of pregnancy. The operation was done under sacral anesthesia. The diagnosis of tuberculosis was made by physical signs and the recognition of tubercular bacilli and elastic fibers in the sputum. The tuberculin reaction was not used. The cases were all those of considerable severity from the standpoint of the tubercular process and some of them had abundant bacilli in the sputum and moderate fever.

The operation was intended not only to aid in checking the tubercular process but to prevent the danger of a possible repeated pregnancy.

**Artificial Traumatic Perforation of the Uterus in the Early Months of Pregnancy.** Petzold<sup>24</sup> refers to cases in which the muscular tissue of the pregnant uterus becomes abnormally soft and yielding, so that it can readily be perforated by the finger or the instrument of the obstetrician. Most of these accidents occur during dilatation of the cervix, followed by the curetting or exploration of the uterus by instrument or finger. In 97 cases of perforation of the uterus after abortion, abortion forceps caused the accident in 53, a curette in 18, dilators, sounds or bougies in 14, a laminaria tent once and catheters or other pointed instruments in 11. Patients themselves produce this accident with the points of syringes; intra-uterine pessaries; a long, stout feather; pieces of wood and other similar objects.

The most frequent site of perforation when the uterus is in its average normal position is the posterior wall of the uterus, just above the cervix; when there is retroversion of the uterus or flexion, perforation is most frequent of the anterior wall, and in those rare cases of lateral flexion the perforation occurs through the right or left just above the internal os. In some cases the uterus is pierced at the fundus or at the entrance of the Fallopian tubes. In a recent collection of 32 cases the perforation was in the posterior wall in 16, in the anterior wall in 8 and at the fundus in 8. When the uterus is abnormally flexed, the site of perforation may be in an unusual location, in some instances the bladder has been separated from the cervix and a considerable portion of the anterior cervical wall torn away. An effort is sometimes made to distinguish between non-perforating and perforating injuries of the uterus, and under this classification those that perforate are, of course, the most important.

The importance of this accident lies not only in the injury to the uterus but the possible opening of the peritoneum, wounding large bloodvessels

<sup>23</sup> Archives f. Gynäkologie, cxii, 256.

<sup>24</sup> Ibid., 1920, cxii, 291.



and injuries to the neighboring organs. If the uterus is perforated by the finger, much less injury is done than when pointed instruments are employed. When placental forceps are used, a portion of the bladder, bowel, omentum or even the appendix may be torn away. The small intestines is not infrequently injured in these cases. Sometimes a considerable portion of the intestines is seized by the placental forceps, dragged into the uterus and loses its mesentery attachment. Cases are even reported in which the appendix has been torn away, in extreme cases, with the placental forceps. The ureter might be injured if forceps penetrate the wall of the womb.

The result of perforation of the uterus depends upon the site of the accident and extent of the injury done to the uterine wall, together with the presence or absence of aseptic precautions at the time of perforation and also the technic employed in saving the tissue afterward.

The writer reports 4 cases, one a multipara, with normal labor and breech presentation. She developed symptoms of retroflexion of the pregnant uterus in the second month of pregnancy, with inflammation of the tube and ovary of the left side. After admission to the hospital, profuse hemorrhage occurred and it was determined to empty the uterus. On introducing a sound, this reached 12 cm. and the point of the sound could be felt by placing the hand on the abdomen. It was evident that perforation of the uterus had taken place.

At section, the perforation was found on the anterior wall, three finger-breadths under the fundus; on the left side there was a large tubo-ovarian abscess firmly adherent to the posterior layer of the broad ligament. When this abscess was emptied, a quantity of thin fluid, but not pus, was removed. To check the spread of inflammation, the uterus was entirely removed. The patient made a good recovery. Examination of the specimen showed that the mucous membrane and decidua had grown to a considerable extent beneath the peritoneum.

A fatal case at autopsy showed great dilatation of the bowels while the bowel had been torn off from its mesentery for a distance of 18 cm. There was considerable hemorrhage at two points in the wall of the severed bowel. The injury was so severe that the patient lived but a short time after admission.

He also reports the case of a multipara in whom a physician introduced a laminaria tent in the hope that spontaneous abortion would result. The patient had had severe hemorrhage and had sought medical help for this reason. The physician later attempted to empty the uterus by abortion or placental forceps and had drawn out a loop of intestines. At operation, the uterus was perforated two fingers-breadth beneath the fundus on the posterior wall; the edge of the wound was not clean. The peritoneum separated from the muscular tissue and in several places had been opened or torn. Hysterectomy was done and the ovaries left. The bowel was resected but the patient died after twelve days' illness. At autopsy, there was acute virulent peritonitis, with abundant *Streptococcus viridans*. The uterus was torn at the os externum toward the left side, the tissue being soft and bloody. The placenta had been attached on the anterior wall and portions of this had been separated.

In the fourth case the patient, while pregnant, had taken an injection of hot water which produced bleeding and for which the physician made an examination and introduced a tampon; this came away and the patient developed considerable hemorrhage and fever. Upon admission to the hospital, there was a small opening in the anterior lip of the cervix. The cervix was dilated and the uterus emptied; the patient subsequently made a good recovery.

The writer reviews various methods of treatment which have been proposed, one of which was suture of the uterine wall, in cases in which the uterus has been retained at operation or the site of operation had been closed.

Nineteen cases have been collected in the literature, with recovery of 18; 1 died of purulent peritonitis. Those who believe in hysterectomy are challenged by advocates of total extirpation, and evidently the choice of method of operation must be made by the circumstances in each individual case.

**Calcium Content of the Blood in Pregnancy, Labor and Puerperal State in Healthy Women and also in Cases Complicated by Nephritis and Eclampsia.** Kehrer<sup>25</sup> has made an extensive study of this subject and reviews the literature to a considerable extent. He finds that in healthy women the quantity of calcium in the blood varies under different circumstances in very slight degree only. In the Dresden clinic in patients between the ages of twenty and forty, and in good general health, it varied from 7.02 to 7.53 mg. on the average of 100 c.c. of venous blood. It is probable there is a distinct relationship between this very moderate quantity of calcium in the blood and the slender development of the skeleton and the occurrence of rachitis in this population.

When there is great hemorrhage in women who are not pregnant, the calcium content was found to be 6.2 mg. which was not as great a diminution as one might have expected. There seems to be some relation between the quantity of blood lost and the formation of calcium salt through the action of prothrombin. In the first half of pregnancy there is no diminution in the quantity of calcium salts in the blood from the normal. In the last six weeks of pregnancy the calcium content was 6.59 to 6.61. On the eighth or ninth day of the normal puerperal period, mothers who were nursing children had calcium content of 6.46 to 6.64. The calcium content of the blood in the last weeks of pregnancy and in the puerperal period of women nursing children is almost identical. It remains at a constant point, and if there is a tendency to variation it is to reduction and not to increase. One must believe that this slight variation is normal and pathologic. While uterine contractions are present, there is slight diminution in the calcium content.

In cases of nephritis and eclampsia complicating pregnancy, the calcium content sinks to 5.84. In puerperal cases complicated by nephritis or eclampsia, the calcium content seems to be practically the same. Whether the patients were on exclusively milk diet or whether they had food rich in calcium, the quantity was never the normal. From his

<sup>25</sup> Archives f. Gynäkologie, No. 112, p. 487.

investigations the writer believes that the calcium content of the blood in diabetes, tetanus, also in pregnancy and in cases from which the ovaries have been removed or their function destroyed by the x-ray, show no essential and practical variation.

**Chorea in Pregnancy.** Matthaei<sup>26</sup> described a case of a married woman, aged twenty years, with good family history and previous good health, who developed severe chorea in the third month of her first pregnancy. In her eleventh year she had an attack of chorea which lasted for several weeks following a severe psychic shock, but from this she apparently made a good recovery.

The attack during pregnancy developed rapidly after a week of apparent nervous irritation. Her movements became so violent that she was unable to stand or sit. Ordinary methods of treatment produced no result. As the disease progressed, the patient's mental condition became involved, she was scarcely able to speak, her laughter was uncontrollable and so were attacks of weeping; she was especially violent at night, when she would get out of bed and shriek and wail. Her condition resembled that of acute mania.

After admission to the hospital, she was treated by intragluteal injections of 20 c.c. of serum from a healthy pregnant woman, and on the next day 10 c.c. of the same serum was given. About an hour and a half after the first injection the patient seemed to be better, and that night slept better, this improvement in the matter of unrest continuing during the next day, but the mental state remained about the same. A further injection of 10 c.c. of serum taken from two pregnant patients was given; again the movements became less, but the mental condition became worse. The patient ceased to speak, refused to answer questions, took food with the greatest difficulty and seemed absolutely apathetic. When efforts to improve her condition had failed, the pregnancy was ended by dilatation of the uterus and clearing out of its contents. The patient immediately began to improve, was able to speak, the expression of the face became intelligent and her apathy disappeared. She had slight tremor on exertion, but her progress to complete recovery continued.

An interesting question arose, How much the injection had to do with the patient's recovery. The writer believes that the fact that the serum was used in comparatively small doses was an important and favorable point. He calls attention to the familiar clinical observation that the occurrence of severe psychic disturbances in pregnant women greatly increase the gravity of the case, and he agrees with Winter that this furnishes valid need for interrupting the pregnancy. It is an unfavorable circumstance when the chorea develops suddenly during pregnancy, and also when a patient, who has had chorea, is similarly attacked during pregnancy. When there are diseased conditions of the heart, liver and kidneys, the gravity of the prognosis is increased. Cases are especially unfavorable in which the chorea develops very gradually, with sleeplessness and great restlessness. These cases are usually of two classes,

<sup>26</sup> Zentralbl. f. Gynäkologie, January 31, 1920.



one of mild, and the other those which rapidly proceed to a fatal termination. In the former, rest and general medical treatment are usually sufficient. In severe cases, treatment is often without effect.

**Tumors Complicating Pregnancy.** Spencer<sup>27</sup> has given the Lettsonian Lectures on tumors complicating pregnancy, labor and the puerperal state.

In treating with fibroids, he states that they are not a rare complication of pregnancy and labor, occurring in 151 cases, but often overlooked. Submucous tumors tend to produce abortion, but these do not. Labor may come too soon or may be considerably deferred, it is often surprisingly simple and easy and the attending physician should remember that the most dangerous thing that he can do in such a case is to attempt to direct the child past an obstructing fibroid tumor by forceps or after version. When operation is necessary, Cesarean section at term, followed by hysterectomy, is usually indicated. Spencer believes that sterility is a cause of fibroids and that fibroids do not produce sterility.

Ovarian tumors bring about abortion in 25 per cent. of the cases in which they complicate pregnancy. At labor, it is very important that, if possible, the tumor be pushed up out of the pelvis at the beginning of labor, and unless this can be accomplished the physician should abstain from attempting to deliver the child, by force, past the tumor. When abdominal section is necessary, the operator should wait for complete dilatation of the cervix, so that while he is completing the removal of the ovarian tumor and the patient is still under an anesthetic the assistant may extract the child through the vagina with forceps. If operation is done during pregnancy, there is considerable risk for the child, and, if possible, operation should be postponed until the child is at least viable.

In cancer of the cervix complicating pregnancy, labor and the puerperal state, Spencer is not convinced that lacerations or erosions of the cervix are important factors in causation. The fact that malignant growth is more frequent in women who have previously had children than in those who had no children leads many to believe that local venereal infection may have something to do with the development of the malignant disease. He describes 6 cases of pregnancy with cancer of the cervix treated by high amputation of the cervix by the actual cautery, with unusual results, namely, three complete cures, the patients being alive and well after nineteen, twenty-two and twenty-five years respectively.

He has found that Wertheim's operation, while a feat of skilful surgery, has not given the good result in obtaining cures for which the profession had hoped. Radium alone or with hysterectomy seems to promise better, but the writer emphasizes the value of the actual cautery in performing the amputation of the cervix. The quantity of radium as yet is so insufficient that we are without intensive data from which to form opinions, and the value of this extraordinary substance can only be accurately determined by the combined investigations of competent physicians, pathologists, operating gynecologists and surgeons.

<sup>27</sup> British Medical Journal, March 13, 1920.

**Occlusion of the Intestine Complicating Pregnancy.** Villaneuva<sup>28</sup> reports 2 cases of occlusion of the bowel occurring in pregnant women. Examination of the urine showed a marked condition of auto-intoxication in these patients. In both, the position of the uterus was normal and the pelvis was free from tumor or exudate. The pregnant uterus, as in all cases, displaced the bowel, but this was not the active cause of the occlusion. There were no adhesions to account for the condition, nor was there, nor had there been, hernia. Intussusception is not frequent in grown persons and is usually associated with diarrhea. There were no symptoms of gall-stones and no evidence of impacted feces. The occlusion was not persistent but intermittent, and the writer believes that it arose from disturbance of the nerve supply of the intestines and that the obstruction was spasmodic.

**Two Cases of Occlusion of the Intestines Complicating Pregnancy.** Hoffman<sup>29</sup> reports the case of a multipara who had abdominal section in 1911, of which an accurate history could not be obtained; the right Fallopian tube and ovaries had been removed.

On admission to the hospital, the patient was evidently very ill. The abdomen was distended, there was vomiting, retention of flatus, rapid pulse and evidence of a recent and complete occlusion of the bowel. The fundus of the uterus could be plainly made out at the umbilicus, and was sensitive on palpation. On opening the abdomen, the uterus appeared, with the intestines, greatly distended. The uterus was apparently five months pregnant. At the former location of the right Fallopian tube, and about 4 cm. from the middle line, a loop of intestines was firmly adherent to the fundus of the uterus; from this point of adhesion toward the right the small bowel was twisted on its long axis 180 degrees. From that point the bowel was very greatly distended and bluish in color; a portion of the intestines was collapsed. The bowel was rotated to its normal position, when it was found that gas could pass through the intestines, the adhesion to the uterus was loosened and the raw surface covered with peritoneum. The bowels then resumed their normal position and the abdominal wound was closed.

On the second day after operation the patient passed flatus, and on the third day the bowels moved. Three weeks after operation the patient was discharged in good condition. Pregnancy proceeded normally and the patient gave birth spontaneously to a healthy child.

The advice to submit to sterilization was given in this case and the patient again appeared for treatment after menstruation had ceased for two months. Operation was declined then with the hope of saving the pregnancy and securing a living child. Three months later, when five months pregnant, the patient again sought hospital care for a second occlusion of the intestines. The signs and symptoms were those which had previously existed. At operation the uterus was five months pregnant, but no adhesions to the uterus could be found. The distended loop of intestines had become twisted into a mass as large as a man's head and there were some adhesions to the mesentery. At some points the

<sup>28</sup> *Rev. de med. y cirug.*, 1919, No. 43, p. 233.

<sup>29</sup> *Zentralb. f. Gynäkologie*, 1920, No. 8.

bowel was greatly distended, at other portions collapsed. The uterus was opened in the median line and the contents removed; a portion of the Fallopian tube was excised and the abdomen closed. The patient again made a good recovery in about three weeks.

The second case, aged twenty-eight years, was admitted with a diagnosis of myoma complicated by intestinal occlusion. There was a tumor of solid consistency two finger-breadths above the umbilicus. The patient stated that menstruation had been absent for two periods. She was doubtful whether pregnancy existed. At operation, the uterus was the size of a man's head, and through the greater portion was firm in consistency. The distended loops of intestines were brought out when it was found that a firm strand of adhesions extended from the left Fallopian tube to the intestines. This was ligated and removed, and the intestines slowly collapsed. A supravaginal hysterectomy was done, with the removal of the left Fallopian tube and ovary. On examining the specimen it was found to be a myoma, and in the cavity of the uterus was a three months' fetus. The recovery of the patient was uninterrupted.

These 2 cases furnish three illustrations of this complication. In the first the adhesions which produced the occlusion of the bowel were evidently the result of pregnancy, and seemed to have been caused by the mechanical disturbances incident to the growth of the uterus. The adhesions were firm and had evidently persisted for a long time. The occlusion occurred when the loop of intestines had become so sharply bent that its lumen was closed. Unquestionably, ileus would have developed independent of the pregnancy at some time or other. When the second occurrence took place in the same patient, the growing uterus evidently was in no way responsible for it, for the strand of adhesions had formed independently of its development.

In the case of myoma, compression by the uterus and its tumor had little or nothing to do with the occlusion of the bowel. This was the result of bands of adhesions to which the growing uterus and dislocation of the Fallopian tube may have given a predisposition. If, however, the band of adhesions had really formed, the development of occlusion was only a matter of time. In operating upon these cases it is advisable, if possible, to empty the intestines without producing an artificial anus; this can usually be done if the case is operated upon promptly. If the bowel is in a condition of atony to a considerable extent, this renders the emptying of the bowel much more feasible.

It is difficult to decide in these cases whether to allow the pregnancy to go on or to interrupt it, the decision must be made in accordance with the circumstances in each individual case. Premature labor or abortion would considerably complicate the recovery of such a patient after operation. If, however, the operator decides to empty the uterus when he opens the abdomen, he gains by this additional space for the distended intestines and does away with any possible complication which might arise when the uterus spontaneously expels its contents.

The entire operation can be done in a comparatively short time, which is a matter of importance with patients in poor condition. The uterus



should not be emptied through the vagina in these cases, for this procedure is difficult and more dangerous, more tedious and less aseptic. The opening of the uterus through the abdomen is best of all. In the case of myoma the existence of this tumor justified the hysterectomy. These 3 cases indicate that pregnancy in itself does not necessarily cause occlusion of the bowel but that it is in a considerable degree a predisposing element. The growing uterus compresses the intestines, and under these conditions the bowel is readily constricted by adhesions. In these cases there is no direct compression of the intestines by the uterus. If, however, loops of intestines are firmly adherent to the uterus, compression might readily develop.

**Pregnancy Complicated by the Removal of Both Ovaries.** Grosse<sup>30</sup> has collected in the literature of the subject 52 cases in which both ovaries have been removed during pregnancy and adds 1 from his own experience. The operation was done during the first four months of gestation. It seemed to be no more dangerous than any operation on patients who were not pregnant. Abortion occurred in 13.7 per cent. of these patients. The fact that pregnancy continued after the removal of the ovaries shows that the corpus luteum is not essential for the growth of the embryo. When but one ovary was removed during the first three months, abortion occurred in 11.5 per cent., and when one ovary was removed in the fourth month, pregnancy was ended in 3 per cent. When both ovaries were removed during the first two months, 25 per cent. of the patients aborted. When the ovaries were removed in the third month, 11 per cent., and when in the fourth month, 12 per cent. These figures are taken from a compilation by other writers. In Grosse's series, when both ovaries were removed during the first two months, 16 per cent. aborted; in the third month, 11.5 per cent.; in the fourth, 10 per cent. It may be noticed that abortion is less frequent the later in pregnancy the operation is done, and this would suggest that corpus luteum may be of some value in the development of the embryo.

**Twin Pregnancies in a Single Tube.** Hardouin<sup>31</sup> has collected 36 cases in which he finds a record of 2 fetuses in a ruptured tube. He adds the case of a multipara who had already given birth to 2 children, the last seven months old. Since that time she had menstruated normally and there has been no pregnancy or abortion. Menstruation had ceased but six weeks before, followed by pain in the abdomen and region of the kidneys, and slight hemorrhage from the uterus of insignificant quantity. She was taken with sudden and severe pain in the abdomen, which compelled her to immediately go to bed. There was considerable shock, distention of the abdomen and vomiting. The patient was put at absolute rest and ice was applied over the abdomen. After several days she grew somewhat better and tried to get up. This was followed by a return of the symptoms and the patient was brought to the hospital. Upon examination the diagnosis of ruptured ectopic pregnancy was made, and, after a short delay, the abdomen was opened. A considerable mass of blood-clot was found in the pelvis, and with rupture of the tube

<sup>30</sup> *Revue Franc. de gynécologie et d'obstétrique*, November, 1919, No. 14.

<sup>31</sup> *Archives Mensuelles d'Obstétrique et de Gynécologie*, June, 1919.

and two fetuses about 3 cm. in length. Rupture had occurred from the right tube, which was immediately removed. The left tube and ovary were healthy. The abdomen was closed without drainage; the operation was performed as rapidly as possible. Recovery followed.

**Prenatal Care.** Goodman<sup>32</sup> reviews the subject of prenatal care. That there is need of this may be inferred from the fact that more than nine-tenths of pregnant women in the United States receive no prenatal care. Forty per cent. of all confinements are in the hands of men not competent to practice modern obstetrics. The writer believes that pregnant patients should select their forms of exercise with care. Dancing he considers injurious, but amusements which divert and rest the patient are very valuable. The pregnant patient should avoid severe, long-continued manual work.

The use of the motor car by pregnant women is dangerous in many cases, and special care should be exercised in it. As pregnancy advances, special caution should be taken in descending stairs. Disastrous falls are not uncommon in pregnancy and may result seriously.

For the vomiting of early pregnancy there is no specific, but little can often be done to tide the patient along until after the formation of the placenta. Headache is an early symptom which should never be slighted. The physician at once should ascertain whether this is caused by toxemia, defective vision or any one of the many conditions which may disturb the nervous system. The nausea of early gestation requires careful analysis. There is no specific treatment for it, but if cases are thoroughly investigated a means of treatment which will be successful will usually be found. The examination of the urine at regular intervals is imperative. The mere presence of serum and albumin is not in itself a grave matter, but when other pathological conditions as well as these are present, prompt and thorough treatment is required. Blood-pressure the writer does not consider as valuable as is commonly supposed. He would take it as part of the general evidence, but would not rely exclusively upon it.

It is of the utmost importance that the bowels move regularly and that the fecal matter is soft. This is best accomplished by a carefully selected diet, by the free use of cereals and fruit. Walking in the open air daily is a matter of prime importance. This has more to do than is commonly imagined with prevention of constipation and the promotion of nutrition. The use of outdoor air in sleeping porches is a matter of study for each individual case. Care should be taken that the patient does not become chilled while sleeping out during the night. Suitable clothing and the avoidance of pressure is a matter of equal importance with exercise. Special attention should be given to the breasts, including thorough washing with Castile soap and warm water followed by application to the nipple of alum and cocoa butter. The hygiene of bathing is also important and extremes of heat and cold in both the bath water and the atmosphere of the bath room must be avoided. Gradual douches, given carefully, frequently increase the comfort of the patient very

<sup>32</sup> American Journal of Obstetrics, December, 1919.

greatly, while the fact that a woman has had several children spontaneously would seem to indicate that the pelvis is normal; it does not do to depend upon this for pelvimetry. Each pelvis should be carefully measured. In early pregnancy, a vaginal examination should invariably be made.

The apprehension felt by some dentists in assuming operations during pregnancy is ill-founded. The care of the teeth is of primary importance. The possibility of syphilis must never be forgotten, and if the diagnosis can be made, treatment by salvarsan may be employed with benefit. The Wassermann reaction is not always accurate in pregnant women but when it is, it is markedly positive.

The minor complications of pregnancy, as varicose veins and eruptions upon the skin, should not be neglected. The heart and lungs should be examined, also the history of mental disease or disturbance in the expectant mother; infective foci, as the appendix and tonsils, should be removed as soon as their condition is recognized. The writer's experience with goiter in pregnancy has not led him to consider it a serious complication. The thyroid gland will often change in size and consistency during pregnancy without appreciable cause. It is rare for this condition to seriously interfere with parturition.

The writer is not disposed to believe that pregnant women cannot be safely subjected to surgical operations. His experience has shown that under good circumstances, with skilled care, the great majority of cases requiring surgical operation may have these operations in well-equipped hospitals, with excellent results. The presence of pus is a most formidable complication and predisposes to the formation of adhesions after the operation. He doubts if pregnancy predisposes to appendicitis, but believes that it often lights up an old condition. Hernia, he believes should be subject to operation, but before or after pregnancy. Cancer of the cervix can sometimes be removed during early pregnancy to great advantage.

**Four Years' Work at the Antenatal Clinic.** Cook<sup>33</sup> describes the work of the antenatal clinic at the Norwich Maternity institution during four years. There were 308 patients, 151 primiparæ and 157 multiparæ, who came to the dispensary to secure attendance at their homes. Careful records of the cases were kept and filed. It is a rule of the clinic that all primiparæ should attend the clinic regularly, and also such multiparæ as might complain of symptoms indicating some abnormality. Patients presenting suspicious symptoms were also asked to attend the clinic regularly. Patients were encouraged to come to the clinic at all stages of pregnancy, especially in the early months. The examinations made at first were repeated at the end of the seventh month. All primiparæ were subjected to a physical examination, which was thorough. An examination of the urine was made at least once each month and the blood-pressure was taken regularly. With multiparæ the same precautions were observed when there was a history of any previous complication. There were 2 cases of contracted pelvis, 1 with a high degree

<sup>33</sup> British Medical Journal, March 29, 1919.



of deformity, and for this Cesarean section was successfully performed. The other patient had a larger pelvis, with a history of difficult breech labors and death of the child. This patient did not report to the clinic until a month from her calculated date. An overgrown stillborn child was rapidly delivered by forceps and the patient passed into a profound collapse, but ultimately recovered. If she had reported at the clinic regularly during pregnancy this dangerous complication might have been avoided.

There were a very considerable number of cases of abnormal pelvis. In 48 women the vaginal discharge was abnormal. All of these patients received treatment during pregnancy and each had a card addressed to an attendant midwife. In this a prominent notice directed her to give, if possible, a douche before labor and the use of protargol in the eyes of the child. Not a single case of severe ophthalmia occurred during the four years. There was not a case of syphilis either in the first or second stage of labor.

Seven patients had heart disease, with some failure of compensation. All but one passed through labor without help. Strychnine and digitalis were given during the last weeks of pregnancy. One patient who had been receiving treatment was found dead in bed a few weeks before full term. This case is an illustration of the extreme difficulty of making a prognosis and instituting treatment in many cases of heart disease complicating pregnancy. The results of treatment in the others were so successful as to indicate the need for constant observation in pregnant women with heart conditions.

No case of recent enlargement of the thyroid gland was observed. Three of the patients showed signs of thyroid enlargement, but with them the disease was of long-standing.

A comparison was made between the circumference of the abdomen during the eighth or ninth month of pregnancy and the weight of the child immediately after birth. This study was carried out in 148 cases. Excluding 5 cases which were noted as fat and 1 of hydramnios, the results seemed to indicate that with a circumference not exceeding thirty-six inches the child will not weigh more than seven pounds.

Blood-pressure was unaltered in normal pregnancy. Varying blood-pressure may be caused by something abnormal in the pregnancy or some diseases complicating the condition of the mother. One of the cases having albumin in the urine was a primipara in the later months, with much edema and a very high percentage of albumin. After an induced labor this patient still had a heavy trace of albumin in her urine and had morning headaches. It is difficult to decide why these conditions should persist after the termination of the pregnancy.

When the veins of the lower limbs were greatly enlarged, bandages were used up to a point just below the knee. Some of these patients were improved by strychnine and digitalis given internally. The etiology of this condition is obscure, and mechanical causes do not entirely explain it. It seems to be largely a question of circulatory power. Among the others there were some multiparæ, who gave no evident sign of disease or abnormality, who complained of feeling faint or

badly or who gave a history of a slight blood loss in pregnancy, showed a greater liability to give birth to stillborn or premature children. In the present stage of our knowledge, there is no adequate explanation for this phenomenon.

During the recent war and disturbed conditions there was great opportunity to study the effect of active work upon the health of pregnant women. Under the title, "The Health of the Working Woman," the *British Medical Journal*, May 24, 1919, contributes an editorial on this subject. It was found that with sufficient food and reasonable conditions of ventilation at work and comfort at home that women could stand harder work and longer hours than had been generally supposed. This has practically been seen in other countries among peasant women working on the land, but it had not been commonly observed previously. Undoubtedly the increasing employment of women tends to accelerate the fall in the birth-rate, especially when a high proportion of married women is employed. Those influences which tend to infant mortality are poverty, bad housing and defective sanitation, lack of education in the mother and the nature and occupation of the parents. Frequently several of these causes occur together in the same district and in the same family. Poverty and bad housing are often inseparable, and ill-paid work and a low standard of domestic hygiene are usually associated. The effect of occupation is very important, for while the mortality among the infants of unskilled workers was rated at 152.5, among those of agricultural laborers it was 96.7 and among the upper and middle classes 76.4. Overcrowding is an important factor in producing these results. Of all occupations in which women work, mining produces the greatest infant mortality. Among textile workers the infant mortality rate is 148.1, and it was also very high among those working in potteries. In both industries many married women are employed for long hours and away from home. This has a bad effect upon the health of the mother in pregnancy, and after delivery it injures the child by depriving it of the mother's nursing and her care.

There is a special provision regarding the employment of pregnant women in the act to govern the working of women in factories and workshops. This forbids a woman to be employed within four weeks after giving birth to a child. There is no administrative machinery for carrying this out, but women seldom desire to work within that period. From the interests of the child the most dangerous period of pregnancy is the first three months. Women often conceal their condition at this time, and such cases could not be detected unless the law be put in force for the notification of pregnancy. Many believe that such notification is highly undesirable. The number of women employed in the latter stages of pregnancy is relatively small, and it is thought that all pregnant women can best be protected by measures which provide antenatal and maternity facilities for women who are willing to take advantage of them.

Attention is given to the proposal that grants of money in aid of maternal and infant welfare be made. An estimate shows that this would result in a very large annual outlay and that the difficulties of

administration would be exceedingly great. There are, however, many agencies by which practical help can be given to pregnant women by affording medical treatment, advice or help through the visitors, the use of maternity centers or infant welfare centers, and, if necessary, by the distribution of food or milk. It is thought undesirable to change this system of aid at present. It is also suggested that a payment similar to that made to the employed wives of injured men be made to pregnant and nursing women.

There is need of further study by scientific method to determine the physical effects of employment on girls and women. Unquestionably, the regulations now in force may be modified to advantage. Local factory medical service should be established and women medical inspectors of factories are badly needed.

**The Nutrition of the Fetus.** Slemons<sup>34</sup> states that pregnancy is essentially a problem in nutrition, and that during this period the important factors are those which favor growth. The mother usually gains in weight about 30 pounds, exceptionally as little as 10 to 15 pounds, and sometimes as much as 40 to 50. With patients who are inclined to gain the increase is more, and women gain more in later pregnancies than in the first. In the early months of gestation there is no gain and sometimes slight loss. Some patients gain slightly immediately after conception. In the last three months the average for each month is between 3.5 and 5.5 pounds. This gain in the mother is partly the fetus, its appendages, the increase in the size of the uterus and the breasts. All maternal tissue have gained in some degree. This general increase in size is often overlooked; one can appreciate the actual growth of the mother's body by deducting from the mother's total gain in weight the weight of the fetus at term and the weight of the uterus. These calculations, however, account for only half the actual increase in the mother's weight, and thus the remainder must be ascribed to the tissues of her body. From this we are able to determine whether the material which provides for the growth of the ovum comes from the mother's tissue or from her food.

If the mother does not have sufficient food during pregnancy, the child will grow at the expense of the mother's tissue. Probably some quantity of the mother's tissue is given regularly to the ovum during the period of implantation, but this is a short time and ends with the establishment of the placental circulation.

These facts seem to point to the conclusion that pregnancy represents a gain for the mother and that her tissues are not deprived of material to feed the fetus. Experiments on animals and observations on the human subject indicate that mothers furnish substance incorporate with the body of the child. In the case of dogs, minute researches show that the animal stores up foodstuffs during pregnancy; more material than is necessary for the growth of the young is accumulated in the body of the mother. Bar's experiment on rabbits lead to the same conclusion. Studies upon pregnant women show that an ordinary

<sup>34</sup> American Journal of Obstetrics, August, 1919.



mixed diet gives sufficient food for every requirement of fetal growth and allows storage to begin in the mother's body at a much earlier period than is generally supposed, possibly at the very beginning of pregnancy.

If the question be raised what substances are necessary for fetal nourishment, there is evidently, on the one hand, those contained in the mother's milk. If we analyze the fetal body we find there is no great difference between the fetus and the adult; so far as the quality of the food requirement is concerned, both use the same organic and inorganic substances which are always present in the circulating blood of the mother. This contains nutrient nitrogenous substances, carbohydrates, fat, oxygen, water and inorganic salt sufficient to meet the requirements for tissue growth and the production of energy. These substances, however, do not pass directly into the fetal circulation. It is known that the mother's blood never enters the fetus nor does the fetal blood ever enter that of the mother; an extensive vascular bed is made by subdivision of the fetal blood in the placenta. These vascular loops are covered with connective tissue and embryonic epithelium. The loops, with their enclosing layers of tissue, form the chorionic villi.

In early pregnancy the epithelial covering of the villi has two layers, reduced later to one about the thickness of endothelium. The size and complexity of the placental partition varies inversely with the requirements of the new organism for nutrition. In early pregnancy the materials required by the embryo are very little; after the eighteenth or twentieth week of pregnancy, when the simplification of the placental partition takes place, they increase. The maternal blood passing through the placenta comes in contact with the villi and the exchange of material to the fetal blood takes place; substances pass in opposite directions, but through the same placental partitions. There is no positive knowledge as to how this is accomplished. If the placenta is normal, no insoluble substances pass through it. The elements of the blood are confined to that circulation in which they originate, so that a fetus, in the case of a mother suffering from leukemia, has a normal blood. It has been proved that insoluble material introduced into the circulation of mother or fetus remains in that circulation.

By experiment of 73 substances examined, 43 passed readily through the placenta; among these are strychnine, hydrocyanic acid, nicotine, curare, pilocarpine, physostigma, phlorizina, sodium sulphate, methylene blue and adrenalin. Carbon dioxide is the only fetal waste product which has been studied. We do not know how fetal waste products make their way to the placenta and through it to the maternal organisms, as so little can be learned in this matter by experiment; clinical observations offer more chances of being successful. The writer's investigations were made of specimens of maternal and fetal blood taken simultaneously just after the birth of the child. The fetal blood was taken from the placental end of the severed cord, the maternal from one of the veins in the forearm. In some cases a number of ingredients in the blood were recognized, but more frequently but one or two could be distinctly identified.

The writer finds that without certain reservations one should not infer that what has been found true for the placental interchange at full term is true in the early months of pregnancy, when the thickness and complexity of the chorionic villi are much greater than at the latter period. An important change occurs in the placenta from the eighteenth to the twentieth week and then begins the more rapid growth in the child. During the later half of pregnancy the placental partition is a semipermeable membrane. The amino-acids, from which the fetal protein is built, and glucose, which supplies energy for the building of tissue, passes freely from mother to child. While these substances are in the mother's blood they are not more accessible to her own tissues than to those of the fetus, and the quantity which reaches the new organism is regulated by the rapidity with which they are used, so the supply of water and most of the inorganic salts are similarly regulated. It is not known how iron is assimilated or transmitted to the newborn child; large quantities of iron are present, proportionately greater than in the adult. It is believed that this is to compensate with the lack of iron in the mother's milk. The fats and lipoids in the mother's blood are held in check by the placenta, and the fetus makes these substances probably from glucose given by the mother. The blood of the pregnant woman has a high fat-content while the blood of the fetus is much lower.

The waste products of the fetus, including carbon dioxide, pass through the placenta by the laws of diffusion. If the mother's organs of elimination perform their function properly, the blood maintains the proper concentration and the blood of the fetus is constantly purified. In cases of nephritis and organic disease of the heart, large quantities of excretory products appear in the mother's blood and also in the blood of the fetus. In some cases we must believe that death of the fetus *in utero* is the result of those maternal complications which result in the inefficient removal of the waste material of the fetus. The nutrition of the child involves two factors, the activity of its own organs and the supply of its food. As we know very little definitely concerning fetal metabolism, we may imagine that it resembles that of the adult person. The large size of the thymus gland and other peculiarities in the fetal body show that the nutrition of the fetus must, however, be different in some essential processes than that of the mother. When we consider diet we find there is no diet especially adapted to the state of pregnancy. The mother may exercise the same freedom as anyone else in the selection of food. She should take what agrees with her and avoid that which she cannot digest and assimilate. Personal experience is the gauge, and most women can follow the dictates of appetite after they become pregnant as safely as they did before. The quantity of the mother's food is of more importance than the quality. The mother does not need an excessive quantity of food. The diet which has previously been sufficient for the mother should suffice during pregnancy. She should avoid over-eating which is much more likely to promote discomfort than insufficient nourishment. If measures are rigidly carried out to restrict

the growth of the fetus, they also tend to weaken the mother. She may be careful to avoid overgrowth of the child, but she should not so limit her food to interfere with normal development. If the mother's health and strength are kept up, no thought may be given as to the size of the child. If the physician determines the presence or absence of disproportion between the size of the fetus and the size of the mother's pelvis, he is often qualified to decide what treatment is necessary in the interest of the mother and child.

**Placenta Previa.** Briggs,<sup>35</sup> of the University of Liverpool, contributes a well-illustrated paper upon this subject. He describes a case of central placenta previa in a multipara successfully treated by Cesarean section and also a low lateral placenta previa in a primipara treated in the same manner with success. He illustrates the case of a woman, with central placenta previa with a full-grown male fetus and undilated cervix and very slight separation of the placenta, who died in an ambulance on the way to the hospital. This case could probably have been saved by early diagnosis and prompt operation. He also illustrates the case of a multipara who had repeated hemorrhage, with collapse, and delay in obtaining medical help, who was admitted to the hospital in profound shock. Hemorrhage was checked by podalic version, but the maternal shock resulted fatally. A central placenta previa at the thirty-fifth week is also described, treated by version, with the expulsion of a stillborn child. The mother recovered.

The use of the dilating bag by Champetier de Ribes is illustrated in the case of a multipara with placenta previa separated throughout the lower third of the placenta. Version resulted in a spontaneous expulsion of a dead male fetus. The mother recovered. He also describes 2 cases of placenta previa with prolapse of the placenta. In 1 there was shoulder presentation treated by internal podalic version followed by the spontaneous expulsion of the placenta, after which a macerated male fetus was delivered. In the other case a multipara had placenta previa, the placenta appearing at the vulva. A six and a half months' fetus was expelled in the membranes, without excessive blood loss. The difficulties of diagnosis in placenta previa are illustrated by the picture of a specimen showing an organized, tongue-shaped blood-clot continuous with the margin of the placenta in a case of lateral placenta previa. After version the fetus was expelled alive and survived. In another case, placenta previa was simulated by encephalomeningocele. This specimen is one of considerable rarity.

The writer urges the importance of the initial hemorrhage as a warning. The patient should be immediately sent to the hospital, and the fetus must be considered viable at or after the thirty-sixth week. The bulk and area of placenta previa in the obstruction zone of the genital tract can be approximately estimated by examination. This may be an important factor in directing the management of the case. When patients are brought early to the hospital, with complete equipment mother and child are safest by Cesarean section.

<sup>35</sup> British Medical Journal, February 15, 1919.



**The Treatment of Incomplete Abortion.** King<sup>36</sup> treats incomplete abortion as follows: The patient is anesthetized and a thorough preparation is made with green soap and hot water and alcohol, followed by the introduction of a self-retaining speculum, the drawing down of the cervix and gentle dilatation if it be needed. In most patients there is sufficient dilatation to permit the introduction of sponge-holding forceps or the finger and no further dilatation is necessary. A pair of ordinary sponge-holding forceps is then carried within the uterus and the retained portions of the embryo and its membranes are removed. This is done several times until nothing more can be found, when the uterus is sponged out to efficiently dispose of fragments. Then the cervix is dilated, if necessary, and the finger is carried into the uterine cavity and palpation is carefully done to make certain that the uterus is empty. No douching is practised, no antiseptics are introduced within the uterus and there is no tamponing except in rare cases when hemorrhage develops. The patient is then kept quiet for several days in accordance with the progress of involution. As soon as the uterus has grown small, she gets up and leaves the hospital after a few days. The writer prefers this method to the use of the curette.

**Hernia of the Pregnant Uterus.** Le Desma<sup>37</sup> publishes a description with illustrations, of a pregnant woman, aged forty-two years, having a huge hernia which did not interfere with the action of the bowels. For a long time the patient had suffered from reducible inguinal hernia. About the middle of the seventh pregnancy the hernia suddenly became immensely larger and could not be reduced. Fetal movements soon developed and a Committee from the Medico-Chirurgical Academy was appointed to observe the cases and to see that Cesarean section could be performed at the proper time. By this means a viable child was delivered from the hernia. Many interesting observations were made concerning auscultation of the uterus. Afterward the uterus was reduced and menstruation developed regularly and normally.

**Prolapsed Uterus.** Anderodias<sup>38</sup> describes a case of unusual pregnancy in which the uterus was so prolapsed that the cervix protruded from the vulva. The patient was in her third pregnancy and the prolapse had developed after the end of the first pregnancy and persisted. Three years afterward conception occurred and the patient went to full term. In spite of the operation done three years later it was impossible to replace the uterus in its normal position. At the age of thirty-one years the patient again became pregnant, and when examined was in the eighth month. The author believes that these cases usually go to full term and that if proper precautions be taken the patient in the puerperal period may escape infection of the uterus.

**Myomectomy during Pregnancy.** Farmer<sup>39</sup> describes the case of a primipara, aged thirty-one years, pregnant three months, who had intense pain in the right iliac region, with constipation which had con-

<sup>36</sup> New Orleans Medical and Surgical Journal, March, 1920.

<sup>37</sup> Revista Espanola de obstet. y ginecologia, May, 1919.

<sup>38</sup> Jour. de méd. de Bordeaux, August 25, 1919.

<sup>39</sup> Australian Medical Journal, 1919, i, 384.

tinued for over a year. Upon palpation in the right iliac region the tissues were found to be extremely tender, and an elastic tumor was made out. Upon vaginal examination the fundus uteri could be felt pushed to the left side and well above the brim. In the right fornix a tumor could be palpated which was exceedingly sensitive.

Upon opening the abdomen, the tumor was readily delivered through the wound and proved to be a non-pedunculated myoma growing from the anterior surface of the right cornua of the uterus. Adhesions were distinct. The patient had been pregnant fully three months. The peritoneum was incised around the tumor some distance from its base and the peritoneal cuff was carefully made. The whole mass was then easily removed with a blunt dissector. A deep hole was left, but this did not enter the uterine cavity. The uterine muscle was closed by suture and the peritoneal cuff inverted. The tumor weighed 425 grams. The patient had an uninterrupted recovery, without the interruption of pregnancy. At the end of the seventh month labor was induced and a healthy male child was born weighing 3300 grams. The mother made a perfect and complete recovery.

**Toxemia of Pregnancy.** THE CAUSE AND TREATMENT OF THE TOXEMIA OF PREGNANCY CHARACTERIZED BY VOMITING AND ECLAMPSIA. Hoffbauer<sup>10</sup> endeavors to throw some light on the difficult problem of the cause of pernicious nausea and eclampsia, by narrating his experience in the treatment of these cases with ovarian extract. He describes the case of a primipara, aged twenty-nine years, in the second month of pregnancy, with pernicious nausea and vomiting. The patient was in an extreme degree of emaciation and prostration. Three ampules of ovoglandol were given by hypodermic injection. On the following day three injections were administered, vomiting ceased and pain in the epigastrium, which had been severe, subsided. Six days later the vomiting returned, when the same remedy seemed efficient in checking it; there was no further development.

He also describes the case of a primipara in the ninth month who had severe eclampsia. The urine was scanty, dark reddish brown. Cesarean section was practised under mixed narcosis preceded by opium. On the evening following, eclampsia again developed, with high pulse tension, and bleeding was performed. A very slight secretion of urine developed, but this ceased. The patient's temperature rose and, although bleeding was repeated, she seemed to be rapidly growing worse. She became entirely unconscious, with very scanty secretion of urine. Ovoglandol was then administered, when the patient slowly improved and ultimately recovered.

The writer urges that a thorough trial be given of ovarian extract in some form in these cases. He expresses the opinion that the toxemia of pregnancy depends upon abnormal action in the suprarenal and pituitary body, and he believes that ovarian extract is naturally indicated to control this condition.

<sup>40</sup> Zentralbl. f. Gynäkologie, 1920, No. 6.

THE TOXEMIA OF PREGNANCY AS TREATED BY SERUM. Vieira<sup>41</sup> gives the results of experiments to determine the value of serum in treating the toxemia of pregnancy. He used the liver suprarenal extract in treating the toxemia of pregnancy, but the results were unsatisfactory, as it was not known what glands in the patient were at fault. Further experiments were made, using the serum from a gravid goat. With some women this brought on urticaria, and in one woman there was severe disturbance, with nausea. The treatment was modified in view of these experiments.

The proteids were extracted from the goat serum, leaving the other elements, and the serum was evaporated to one-fifth, which made a single dose. This method of dosage showed that the therapeutic effects were the same as with the entire serum, while the ill-effects were avoided. With one or two injections, nausea and vomiting and eclampsia subsided promptly in some of the cases reported, while the effect was also good in sciatica, neuralgia, jaundice, headache and gastro-intestinal disorders occurring during pregnancy. With this method of treatment, the interruption of pregnancy for toxemia should very rarely be necessary.

VOMITING OF PREGNANCY TREATED BY CORPUS LUTEUM EXTRACT. Quigley<sup>42</sup> has treated 17 cases of vomiting of pregnancy with corpus luteum extract. Of these, 12 were benefited permanently, 4 were better, but then relapsed because enough of the preparation was not given. In 1 case there was complete failure and in 1 case of obstinate pruritus there was no relief. The average number of doses used was 7. If the 4 relapsing cases had been given larger doses at the beginning of the treatment the author believes that they, too, would have been permanently benefited. The proportion used consisted of an ampoule, with a capacity of 1 c.c., containing 0.2 gram of the desiccated substance of the gland.

Upon examining the records of his cases it was found that one patient was markedly neurotic and illegitimately pregnant. Another had moderate nausea of four weeks' duration and was cured by 5 grains of corpus luteum extract given by mouth three times daily. Another patient had very annoying and severe salivation, and this disappeared with the use of corpus luteum. A primipara, aged twenty-one years, had nausea and vomiting so severely that she was put to bed and on a limited diet. The vomiting stopped but it returned as soon as she got up. Finally, she was in bed for six days and able to retain nothing. Physical examination was negative and the patient was sent to the hospital, where she was carefully fed and given corpus luteum extract by injection daily, twelve doses in all. Five per cent. glucose solution was given by rectum by the drip method in large quantities and always retained. Sodium bicarbonate solution alternated with this was not retained so well. Treatment failed completely to control the condition. The metabolism became much worse and therapeutic abortion had to be performed. Another patient was greatly improved by the treat-

<sup>41</sup> *Annales Paulistas de med. e cir.* S. Paulo, May, 1919, No. 11.

<sup>42</sup> *American Journal of Obstetrics, August, 1919.*



ment after various drugs, as cerium oxalate, bismuth and cocaine had completely failed.

THE RELATIONSHIP OF DENTAL ABSCESS TO THE TOXEMIA OF PREGNANCY. It is commonly recognized that foci of infections in any part of the body may produce a toxemia in pregnancy. In the *California State Journal of Medicine*, November, 1919, Loomis records 8 cases in which the evidence is clear that abscesses in the teeth were the cause of the toxemia of pregnancy. The proof that this supposition was correct lies in the fact that the removal of the diseased teeth was followed by the prompt recovery of the patient.

Valentine,<sup>43</sup> at the Edinburgh Royal Maternity Hospital, had frequently noticed a bad set of teeth in pregnant patients who came to the antenatal clinic. He made a systematic examination of 100 cases. These applied for treatment at nine meetings of the clinic; there were no selecting of cases, but the mouth of each patient was examined and the results reported in the first 100. Although many patients paid return visits they were counted once.

A very curious fact developed in the answers given to questions: One patient stated positively that she had never had toothache, but it was found that her teeth were entirely false and that all had been extracted. Another said that her teeth were in very good condition, when it was found that she was wearing false teeth and did not have any of her own left.

In the 100 there were only 2 in whom all the teeth were free from decay. One was a primipara, aged twenty-three years, the other a woman of the same age in her second pregnancy, who complained of toothache and earache. The remaining 98 patients had all defective teeth—many of them decayed and some had been extracted. None of the patients were in the least surprised at the condition of the mouth, but considered it an inevitable accompaniment of pregnancy.

Eight of these women were 20 or less. The youngest, aged seventeen years, had already several diseased teeth. Forty-eight were between twenty-one and twenty-five, 14 being twenty-two, 11 twenty-three. There were 20 between twenty-six and thirty; 22 between twenty-one and forty; 1 was forty-one and 1 was forty-four; 56 per cent. were twenty-five years old or less and only 2 of these had complete and undecayed sets of teeth.

Fifty per cent. of these patients were primiparæ, 20 in the second pregnancy; 11 in the third; 7 in the fourth; 7 in the fifth; 1 in the sixth; 1 in the seventh; 2 in the eighth; 1 in the tenth and 1 in the eleventh.

Twenty-two of these women had suffered from toothache or neuralgia during the present pregnancy. Seventy-eight said they had been quite free from pain, but a few added that they no longer had any teeth to ache. Only 1 of these who had toothache admitted that she had suffered a great deal. She was in her third pregnancy, aged twenty-one years, had two teeth extracted and 1 decayed still in her mouth. Almost everyone admitted to have had toothache at some time previous to the

<sup>43</sup> British Medical Journal, July 26, 1919.

present pregnancy. Toothache and neuralgia in the present pregnancy gave little or no indication of the actual amount of decay in the mouth, and this was proved by actual inspection of the teeth.

Four primiparæ had one carious tooth and 1 had had 5 extracted and now had a completely healthy mouth. She was a primipara. Ninety-three of the 100 had more than one decayed tooth or had had more than one tooth pulled. The usual report was several now decayed, several already extracted. Many of the other patients had mouths only in fair condition, while a considerable number had lost most of their teeth. There were not a few cases of marked oral sepsis and a great many with slighter degrees of this infection. When it is remembered that 56 per cent. of the women were twenty-five or younger and that 50 per cent. were pregnant for the first time, while 31 were pregnant for the second or third time, the clinical picture is a bad one.

As far as previous treatment was concerned wholesale extraction and the washing of one or two plates had been the usual procedure. Forty-eight per cent. had been wearing false teeth. Of these, 8 had upper and lower plates and the ninth was about to add a lower plate to the upper; 38 had a single lower plate. Fifty-two had no false teeth. The filling of teeth had been very seldom done and in only 3 cases was there a clear history, although possibly the patients did not always report correctly. In a few instances patients had received some sort of treatment, but there seemed to have been a fear to treat the patients because of their pregnant condition.

These cases show an alarming amount of dental deficiency and oral sepsis among working-class mothers. Such a condition could not fail to injure her digestion and the nutrition of the child. This would also retard the recovery of the mother, and her gain in strength in the puerperal period, even if the condition did not increase the danger of septic infection. Bad teeth cannot help lactation. There must also be considerable suffering among these patients, which is always depressing.

Maternity hospitals should have a dentist upon the staff. The mouths of all the patients should be inspected upon admission and each one receive prompt and adequate attention. The removal of teeth should be done as rarely as possible, and every means taken to prevent the development of oral sepsis. Because the patient is pregnant is no reason why teeth should be neglected, but, on the contrary, they should receive careful attention. The fear that dental treatment cannot be carried out during pregnancy without producing abortion or premature labor is not based on accurate observation. Pain should be avoided during dental operations, but if this be done and long operations be avoided, dental work is distinctly indicated.

The reviewer had a most instructive experience some time ago illustrating the influence which the decay of a tooth may have in the puerperal period. A primipara had given birth to a child in spontaneous and comparatively easy labor. Antiseptic precautions had been carried out, and by the third day the patient was nursing her child; pulse and temperature and lochia were normal; a slight chill occurred and the

temperature rose to  $103^{\circ}$ , with considerable increase in the pulse-rate. No pelvic condition could be found to explain the phenomenon. A thorough physical examination of the patient was begun, commencing with the head. The teeth were apparently in good condition, but permission was asked to palpate the gums. Over the root of one tooth there was tenderness and the patient recalled the fact that this was a dead tooth and had required considerable attention from her dentist. He was called in consultation. The gum at the root of the tooth was incised and about a teaspoonful of very foul pus was evacuated. The cavity was disinfected and temperature and pulse immediately became normal. With good dental care the puerperal period was subsequently normal. In this case there was an absence of toothache or of any sign pointing to a dental condition, and had not a thorough examination been made the focus of infection could readily have been overlooked.

**The Nature of Eclampsia.** Obata,<sup>44</sup> adopting the observation that salt extracts of various organs are toxic and that such toxins can be neutralized by blood serum, experimented with salt extract of the placenta upon animals. This substance was injected, and, within a few seconds, clonic convulsions, violent dyspnea, and then, in a few minutes, death followed in the majority of cases. In some the process was more gradual, the fatal issue developing after hours or days, but in all cases dyspnea and convulsions were well-marked features. Post-mortem examination revealed hemorrhages and a process of thrombosis in the lungs and liver. The coagulability of the blood was decreased, and in this the experiments differed from that seen in human patients. On the other hand frequent injections of non-fatal doses, three times a day for seven to twelve days, were given, terminating with a fatal dose. The results were more like those seen in the human subject. The coagulability of the blood was increased. In almost all instances there were hemorrhages from the lungs and thrombosis in the liver, fatty degeneration and sometimes partial necrosis with cloudy swelling, and fatty degeneration and hemorrhage in the kidneys. This corresponds quite closely with the appearance found in the human subject. The writer recognizes the fact that such conditions are not confined to eclampsia and that they may be produced in experiments by using extracts of other organs. The normal serum has the power of neutralizing the toxic elements in placental extract while the serum from eclamptic patients taken during an attack had this property much lessened. He believes that eclampsia is an intoxication by placental poison which results from weakening in the normal capacity of the placenta to neutralize elements in the maternal blood.

**THE TREATMENT OF ECLAMPSIA AND PERSISTENT NAUSEA.** Hofbauer<sup>45</sup> believes that many of the complications of pregnancy arise from pathological conditions in the pituitary and suprarenal glands. The hormones from these bodies influence, to a marked degree, the organs of digestion, excretion and also the brain. He believes that

<sup>44</sup> Journal of Immunology, May, 1919.

<sup>45</sup> Zentralbl. f. Gynäkologie, February 7, 1920.



by giving ovarian extract the action of the pituitary and suprarenals on the sympathetic nervous system can be inhibited. He considers this a specific causal means of treatment, and regards it as antagonistic organotherapy.

He reports the case of a primipara who had pernicious vomiting at the second month and also a primipara near term who had eclampsia. Both were treated by ovarian extract, with good results. He gave this remedy as soon as symptoms developed, and in large quantities, using in addition sedatives, with the exception of morphine and pituitary extract. Chloral he considers dangerous and would limit the dosage to 2 grams given by rectum. He believes that chloral depresses the action of the heart and the respiratory center and that it may readily induce pulmonary edema.

**DECAPSULATION OF THE KIDNEY IN PUERPERAL ECLAMPSIA.** Jullien<sup>46</sup> reports the case of a woman, aged twenty-five years, in eclampsia, whose condition was not improved by delivery but who remained in profound coma, with almost complete anuria. The pregnancy was seven and a half months; the fetus was spontaneously born. After the birth of the child she voided only 130 c.c. of urine in eighteen hours, and this contained 12 gm. of albumin. Both kidneys were then decapsulated, followed by gradual improvement and recovery of the patient. The author urges that undue importance may not be laid upon the operation; it does nothing for the liver or brain; but when the secretion of urine is seriously impaired it produces excellent results. The statistics of the operation show that secretion of urine is reëstablished in 90 per cent. The average mortality of eclampsia for the mother is 39.66 per cent., and this gives an idea of the value of the operation for this one condition. These cases were of exceptional severity.

A parallel is seen in cases of poisoning by bichloride of mercury.

**The Treatment of Abortion Complicated by Fever.** Kolde<sup>47</sup> gives the result of treatment in the Maduburg Clinic during five years' time. The entire material of the clinic was available for this study and the cases were considered cases of abortion at any time during five complete months of pregnancy. Premature labors at six months and cases of criminal abortion were not included, nor were cases of threatened abortion in whom it was found possible to prevent the abortion and continue the pregnancy. The number of patients was 1318. The relative percentage of cases of abortion to other disorders affecting women was computed and it was found that 19.85 per cent. of women admitted were suffering from abortion. The mortality rate of abortion, as compared with the mortality of other diseases of women, was 18.8 per cent. An increase was observed during the years of the war as compared with other years, so also was there an increase in the relative frequency of abortion as compared to other diseases. During a part of the time there was an increase in the cases of prolapsus and also in the cases of gonorrhea. If, from the total mortality, are subtracted cases of cancer and of severe puerperal septic infection, the

<sup>46</sup> Revue Mensuelles de Gynécologie et d'Obstétrique, April, 1919.

<sup>47</sup> Monatschr. f. Gynäkologie, January, 1920.

mortality rate rises to 33.6 of all the cases. During the first years of the War the number of abortions among unmarried women grew less while in the last years it greatly increased. The greater portion of these abortions complicated by fever were the result of interference, or effort at interference, with the pregnancy. It was often difficult to obtain correct data on this point, and a case is described in which the patient dying of fatal infection, from whose uterus a piece of decomposed placenta was removed, absolutely refused to admit the possibility of pregnancy. When one considers that 1318 children were lost and 42 mothers had died, one can realize the seriousness of this condition. During the early months of 1919 there was a remarkable lessening of these cases of abortion. For this it is difficult to give an adequate explanation.

In this clinic an active treatment of abortion complicated by fever has always been considered necessary and has been carried out. Each case is studied bacteriologically, if possible, but recently conditions have been such that very frequently this could not be accomplished. Of these patients who had fever complicating abortion, 72.4 per cent. made good recoveries, 16.8 per cent. were not severely ill, 3.7 per cent. were critically ill, and 7.1 per cent. died. The uterus was thoroughly emptied in each case as soon as possible after admission. The patient was considered to have fever complicating abortion if the temperature rose above  $37.5^{\circ}\text{C.}$ , or if she gave a history of chills, although she may have had no fever on admission. The cases that did well remained in the clinic for eight days, and were then discharged in good condition.

In other cases, although the temperature dropped at first, it rose again after the exploration of the uterus, but no further complication developed. These patients were discharged on an average on the fourteenth day. Patients were considered ill who, after abortion, developed parametritis or exudate in the pelvis, or who were ill for a long time. The mortality rate of 42 was 3.18 per cent. of all abortions. Of 642 cases, 40 had fever on admission, 2 had none on admission but developed it later; in 1 of the patients without fever, vaginal examination showed an aperture in the posterior wall of the uterus admitting the tip of the finger. This patient had been sent to the hospital by a physician who had been treating the case and who had curetted the patient, and there had been considerable hemorrhage. When section was performed, a loop of intestines was found prolapsed through the aperture, and bound down in Douglas's cul-de-sac. This was adherent for 20 cm. and the serous covering of the bowel had become badly damaged. The opening in the intestines was closed, and the uterus was removed. The patient died seven days later from peritonitis.

In the second patient, admitted without fever, pregnancy was between the fourth and fifth month and there had been severe hemorrhage. The fetal membranes were protruding through the cervix. A small bag was inserted, but pains did not develop, and it was removed and a tampon applied. On the next morning there was no hemorrhage, nor was there fever. In the afternoon, however, there developed a profuse hemorrhage, pain and collapse. While the patient was being taken

to the operating room, death occurred. At autopsy, considerable blood was found in the abdominal cavity and there was wide perforation at the fundus of the uterus, evidently the result of mechanical interference. The fetus had been expelled into the abdominal cavity, and the placenta at the point of attachment had been forced upward into the abdomen. The uterus had evidently been perforated in the attempt at abortion. The rupture may have been incomplete at first, but uterine contractions had made it a complete opening.

Of those women aborting with fever, 7.1 per cent. died. This result could not be ascribed to the active treatment employed, for 16 of these women received no direct local treatment, and they had either aborted spontaneously or the uterus had been emptied by a physician before admission, while some of them were so fatally ill on admission that death soon followed. These 16 patients could not fairly be included in the statistics of this series. In the remaining 24 of the 40, portions of retained placenta and membrane were removed from the uterus as soon as the patient was admitted. One of these patients had a double pneumonia five days after the expulsion of the fetus, and this woman was not admitted to the hospital until some time after the abortion. In 2 patients autopsy showed severe pulmonary tuberculosis. There remained then 21 cases in which the ultimate result might have been influenced by the treatment, among these the mortality was 3.8 per cent.; this is considered a good result. Among 621, 4 were admitted having had profuse hemorrhage, and it was necessary to delay operation for some little time. In 10 cases abortion followed criminal interference and 1 of these had a large split in the cervix. Five were severely septic and had symptoms of inflammation of the diaphragm. These results are compared with those of six other clinics in which various forms of treatment are carried out.

It is often impossible for practising physicians, and it has been recently impossible for hospital physicians, to apply bacteriological tests to the contents of the uterus in these cases. Some of those varieties of bacteria which seem apparently innocuous are often among the most dangerous.

It is interesting to observe that none of these patients while in the hospital had profuse or dangerous hemorrhage; this may have had something to do with the favorable result, for it is well known that after operation the resistance of the body diminishes in proportion with the loss of blood. The writer believes that a long-continued treatment and observation of abortion cases not operated upon is a disadvantage. The majority of his patients could be discharged on the eighth day after operation. Under the expectant plan of treatment, the patient's stay in the hospital would be much longer.

The method employed consisted in dilating the cervix as widely as was consistent with safety from lacerations. The uterine wall was then examined as thoroughly as possible with the gloved finger. If there was some difficulty in dilating, Hagar's solid dilators or a laminaria tent was inserted, a small bag was also used in these cases, and, when necessary, the anterior lip of the cervix was split to make possible its



introduction. After the ovum had been loosened by the finger, Winter's abortion forceps were used to remove the debris from the uterine cavity, and, if this result was not satisfactory, the uterus was gone over, with a blunt curette. The uterus was then thoroughly washed out with hot sterile salt solution under very low pressure. A tampon was rarely used, this often set up strong uterine contractions. Pituitrin in doses of 1 c.c., or ergotin injected into the muscles, was given to secure efficient action of the uterine muscle.

**Ectopic Gestation.** Lewis<sup>48</sup> operated on 31 out of 33 cases of ectopic gestation, with 2 deaths, 6 per cent. The cases not operated upon were moribund upon admission. In all these cases there was amenorrhea to some extent, varying from one week to two months, but in all there was the usual history of irregular hemorrhage after the regular period had been missed. This irregular bleeding was supposed to be delayed menstruation, but the blood was not like a regular menstrual flow, but resembled hemorrhage. This was an important point in understanding these patients. In all cases abdominal pain occurred, which varied from the typical shock from hemorrhage to more or less constant abdominal distress. Shock and hemorrhage are easily recognized, but the gradual process, with its distress from distention of the Fallopian tube, or slight rupture, may be misleading. The usual signs of pregnancy are often absent, so that they give little help in diagnosis. It has been stated that there is usually a slight rise of temperature from 99° to 102°. This is less than in suspected inflammatory disease and is not in proportion to the conditions found on local examination. This rise in temperature is caused by free blood in the peritoneum, and to the slow absorption of blood, with the development of localized peritonitis. In one of his cases this symptom led to the diagnosis of appendicitis, but at operation ectopic gestation was present. This symptom is constant and very useful in diagnosis. In cases suffering from shock, the writer operates at once if the case is seen soon after rupture, but if the patient is first observed later, time should be given for recovery from shock before operation. In only one of his cases was the diagnosis made and operation performed before rupture of the sac. Four of his patients have been operated on a second time for tubal pregnancy. The possibility of ectopic gestation should never be forgotten in dealing with the various disturbances of child-bearing women.

Stein<sup>49</sup> had 43 cases of ectopic pregnancy in 580 gynecological patients, making a frequency of 7 per cent. Of the 43, 6 patients had never previously been pregnant. There were 13 primiparae and 6 who had previously aborted. Three women had formerly had ectopic pregnancy and operation.

It has been observed by others that patients are usually sterile for a long time before the development of ectopic gestation. The writer does not agree to this view. One of his cases had no conception for thirteen years, one eleven years, but the greater number had con-

<sup>48</sup> Minnesota Medicine, September, 1919.

<sup>49</sup> Medical Record, March 20, 1920.

ceived within the last three years. In operating upon these patients, it was necessary to remove both tubes in 9, the other tube was abnormal in about 25 per cent. In cases studied by microscopic section, about a third showed evidence of chronic inflammation, with a formation of connective tissue. The writer believes that impregnation usually occurs in the uterus. He considers important factors in producing ectopic gestation are late ovulation, unusual motility of the spermatozoön, the lodging of the ovum in some unusual part of the tube or a subacute inflammation of the tube.

Hartman and Bergeret<sup>50</sup> published the results of their treatment in 186 cases of ectopic pregnancy.

The ages of the patients were from eighteen to forty-five years, the greater number from twenty-five to thirty-five. There seemed to be no relation between the time at which menstruation was established and the occurrence of the accident. Of these patients 46 had given birth at full term at one prior pregnancy; 37 had children but had not gone to full term in the prior pregnancy; the others had two or more normal pregnancies, ending at full term. Of the total number, 66 had never aborted while 48 had aborted once. There had been some operation or treatment for disease of the uterus and adnexa in 69 of these patients. This is considered by the author as significant. Among these 69 women, 64 had ampullar and 5 interstitial pregnancies. The right side was the more usual location of ectopic pregnancy in the proportion of 90 to 70. Nearly all of these cases were tubal. In 93 cases in which the notes are fairly full, there were 74 cases of hemato-salpinx in which the embryo could not be recognized and there were 14 in which the embryo was living. There were but 3 abdominal pregnancies in which the ovum was fixed and had developed in the abdominal cavity.

The details of these patients are given in 153 cases, and of these 150 were tubal. In one, the placenta was attached to the infundibulum and connected with the intestine, and the placenta was inserted on one of the pelvic parts of the large intestine through the colon or the rectum in only 2 cases. There were 119 ampullar pregnancies, 27 of which ruptured and only 4 were followed by profuse peritoneal hemorrhages. In the others the hemorrhage became limited to hematocele. In interstitial pregnancy, rupture and flooding of the peritoneum with blood is usual, and in 24 of these cases this profuse hemorrhage occurred in 23, and in 3 cases of interstitial pregnancy it occurred in 2. If hemorrhage be taken as an important point, there is a distinct difference between ampullar, isthmic and interstitial pregnancy. The old view that abnormality or pathological condition in the tubes and ovaries predisposes to ectopic pregnancy is found to have been correct. Usually a tubal pregnancy followed an ampullar salpingitis. The most frequent form of operation consisted in removing the affected tube and ovary. This was done in 121 cases, with wedge-shaped resection of the cornua of the uterus and in 3 with salpingoplasty of the

<sup>50</sup> Annales de gynéc. et d'obst., 1919, xliii, 321.

opposite tube. Of this series there were 115 recoveries and 6 deaths, of which 4 were due to acute anemia. There were 21 subtotal abdominal hysterectomies, with 20 recoveries and 1 death; 9 extirpations of the uterus, 8 recoveries and 1 death. The interesting question arises as to the future of women from whom one tube and ovary have been removed, and 44 such patients were traced for five years. Five had had children, 4 had had abortions and 5 symptoms of the return of ectopic pregnancy. These statistics indicate that the proportion of normal and abnormal pregnancies following the operation is the same. Unquestionably, these patients avoid pregnancy as much as possible. Detailed histories accompany the paper.

**FULL-TERM ECTOPIC PREGNANCY.** Hutchinson<sup>51</sup> had under his care a woman, aged thirty-five years, in her second pregnancy. She had an abortion at five months two years before, but her general health had been good. Menstruation had ceased, but she had remained well and had had no discharge or signs of bleeding. When examined, the heart and lungs were negative, the cervix was slightly softened and uterus was apparently pushed to the left side. Between three and four months afterward she had considerable indefinite abdominal pain and could not lie on her back without great suffering. Upon vaginal examination no presenting part could be made out, but upon palpating the abdomen the fetus was found in the transverse position. About six weeks later, after a few pains, the patient passed a small substance about the size of a lemon. This was not seen and was not saved for examination. The patient was advised to enter a hospital but declined as she was comparatively free from pain. Some two months later a severe attack of vomiting occurred; the urine was negative and fetal movements could be distinctly apprehended. She finally consented to enter the hospital, where an x-ray examination of the abdomen showed the fetal head on the left side just above the pelvis. The child's breech was above the umbilicus. The cervix was small and drawn back toward the sacrum. Upon opening the abdomen the fetal sac was found adherent to the peritoneum and the sac was delivered after separating the adhesions. The sigmoid was adherent and spread over the upper portion of the fetal sac. This was opened and a well-formed child, weighing eight pounds, was extracted. The sigmoid and ureter were separated from the sac with the greatest difficulty and the mass was removed from the left horn of the uterus. With this a small portion of the fundus of the uterus was removed and the resulting lesion repaired with soft catgut sutures. The wound was closed by layers of silkworm and silk; no drainage. A good recovery followed the operation and six weeks later the patient was able to move about freely and to walk a mile.

**Double Ectopic Pregnancy, with Living Seven-month Fetus.** Blanco<sup>52</sup> has reported the case of a woman, aged thirty years, in the third month of pregnancy, who had violent pain in her right iliac fossa, vomiting, fever, rapid pulse and tympanites. The patient grew better with rest

<sup>51</sup> Surgery, Gynecology and Obstetrics, October, 1919.

<sup>52</sup> British Medical Journal, March 13, 1920.



in bed. The pregnancy continued and fetal movements were felt. Three months later, when examined, the abdomen was the size of a seven months' pregnancy, with a swelling slightly on the right side, reaching three finger-breadths above the umbilicus. A living fetus could be made out with the upper part of this swelling. The lower portion contained the uterus about the size usually in the fourth month of pregnancy. On section a living fetus was found in a cyst adherent to the abdominal extremity of the right Fallopian tube, and, in center of the tube, another cyst which, when opened, was found to contain a dead, atrophied fetus, with recognized blood-clots. It is possible that the patient had two ova impregnated at once; one of them became fixed in the abdominal end of the Fallopian tube and the other in the center of the tube, when it was probably destroyed by tubal apoplexy about the third month of pregnancy, when the patient had a sudden attack of abdominal pain.

**Double Tubal Pregnancy.** Brossmann<sup>53</sup> reports the case of a woman, aged thirty-seven years, a multipara, whose last period was sixteen days before admission to hospital. The blood was dark in color, and the patient had pain in the back and abdomen, spots before the eyes, ringing in the ears and difficult micturition. On admission the patient was pale, without fever, and with a dark-colored discharge from the vagina. The abdomen was not distended, slightly tender and there was resistance on both sides of the abdomen above the tube. Upon vaginal examination the uterus was not enlarged, but there was a tender mass in the cavity of the pelvis behind the uterus. At operation the right tube was found to be pregnant and was removed, and a hematocele behind the uterus was also emptied. The left tube was enlarged, dark bluish-black in color. Both tubes were removed and ovaries left. The patient made a good recovery.

**Interstitial Pregnancy.** An excellent paper on this subject is contributed by Vaulescal.<sup>54</sup> His first patient, aged thirty-five years, ceased to menstruate about five months before she came under observation. She was taken with violent hypogastric pain. The abdomen increased in size and became rigid; under the influence of rest in bed and the application of ice the pain diminished, but evidences of hemorrhage developed, and when brought to the hospital she presented the classical symptoms of loss of blood. Previous history of health was unimportant. Examination showed a tumor in the lower part of the abdomen as large as a fetal head, while vaginal examination found the cervix directed backward and an indefinite mass at the right side of the cervix uteri. At the left there was an abdominal tumor which could not be separated from the other mass. Auscultation failed to reveal heart sounds. The diagnosis was made of interstitial pregnancy, and at operation adhesions were found in the pelvis binding the intestine to the tumor. These adhesions were easily broken up and on the right side the Fallopian tube was filled with bloody liquid and ruptured during manipulation. The uterus was

<sup>53</sup> Zentralb. f. Gynäkologie, 1920, No. 7.

<sup>54</sup> Archives Mensuelles d'Obstétrique et Gynécologie, April, 1919.

increased in size and seemed to be part of the tumor. Hysterectomy was done by transverse section, the round ligament and other ligaments on the right side were ligated, the peritoneum was separated, the neck of the uterus bisected and the tumor was thus loosened from its base. The left Fallopian tube which was elongated, extended down into the pelvis. This tube and ovary were freed, found to be healthy and left in position. The uteroövarian pedicle was ligated and considerable difficulty was experienced in checking hemorrhage. The tissues were brought together and covered with peritoneum. The patient made an uninterrupted recovery.

The writer then gives a detailed account of the macroscopic anatomy of the specimen, and adds illustrations. The fetus was found in a cystic cavity filled with bloody liquid. Part of the wall of this cavity was the uterine wall at the cornua. The fetus was about 8 cm. in length, had undergone some disintegration and the different fetal parts could be with difficulty isolated from the clotted blood. The fetal cord led to a hematoma the size of a small egg, situated at the lower portion of the fetal cyst. Careful examination showed that this hematoma extended to the posterior and superior wall of the uterus through an orifice about the size of a half-dollar. This had probably been occupied by the fetus and its membranes, which had penetrated the uterine wall and become encysted in the wall of the uterus near the fetus. The transverse section of the tissues showed the placental cavity and a fetal cyst. It was evident that something like hernia had occurred which permitted the fetus to escape from its original site, and under the influence of hemorrhage the fetal sac had tended to rupture, but complete rupture had been prevented by adhesions and the fetal tissues had made their way into the uterine wall. A detailed report of the examination of the placenta and uterine muscle, the uterine wall and surrounding tissues, with microscopic illustrations, is added. A section of the lining membrane of the uterine cavity is included in the list. The writer was unable to demonstrate the presence of uterine decidua in this case of ectopic pregnancy.

The second patient had sudden cessation of menstruation, followed by metrorrhagia, which continued with very little pain. Examination showed the uterus somewhat increased in size and at the right cornua a small tumor about the size of a large walnut, giving the impression to the finger of an interstitial fibroid. An anatomical study of the case is added without microscopic detail. The pregnancy was clearly interstitial. The writer's third case had interruption of menstruation for three weeks and believed herself pregnant. She had considerable uterine hemorrhage which persisted, and, on examination, the uterus was found increased in volume, while at the left cornua there was a tumor which could be distinctly felt and which seemed to be independent from the adnexa. The next day she was taken suddenly with violent pains in the abdomen, accompanied by a tendency to syncope. At operation, free blood was found in the peritoneal cavity and a large clot weighing 200 grams. At the left cornua of the uterus there was a node or tumor the size of a large nut. This was reddish black in color,

and on its surface there was a deep fissure which extended transversely. The uterus otherwise was healthy and an effort was made to practise conservative operation and leave the uterus. Accordingly, resection of the left cornua was performed by wedge-shaped incision and the parts were brought together with buried suture. Hemorrhage was not very great; the uterine wall was closed with chromic catgut. The patient made an uninterrupted recovery. This case was studied as were the former, and the diagnosis was proved beyond doubt. The writer adds a considerable bibliography on the subject.

**The Severe Anemias of Pregnancy in the Postpartum State.** Osler<sup>55</sup> reviews the early literature of the subject beginning with Channing's paper in 1842, Lebert in 1853 and Guicherot in 1871. In the subject of severe anemias in general, pregnant women form the basis of monographs by Biermer, Müller and Eichhorst. The Swiss reported a considerable number of cases in Nothnagel's *System of Medicine*, while in English and French literature at this time there was but little reference. In American literature, Channing's paper was remarkable, Cabot's was based upon a series of 1200 cases of progressive pernicious anemia, in 35 of which the disease began during pregnancy, or shortly after labor, and this proportion, 1 in 35, is probably an average for the United States. Davis reported a case and gave a summary of the older American literature, and Findley has written upon the subject more recently.

Osler himself, in reviewing the notes of 23 cases of progressive pernicious anemia found 5 postpartum. Two of these cases were seen while he was in Philadelphia, and there were a few at his clinic at the Johns Hopkins. In Negel's monograph on the blood, German and Swiss cases are reported.

Osler divides these into four groups: (1) The anemia from<sup>a</sup> postpartum hemorrhage, in which the bleeding may be profuse and rapidly fatal. Physicians see fatal hemorrhage in aneurysm, typhoid fever, ulcer of the stomach and ruptured veins of the esophagus. None of these cases are as tragic as that of death from postpartum hemorrhage. This often comes on without warning, but the picture is that of rapid and uncontrollable anemia.

After an abortion, repeated small hemorrhages develop the condition of anemia, and this is occasionally observed after delivery at term. Osler described the case of a patient who aborted at the fourth month of her seventh pregnancy, and on admission to the hospital had been losing blood for one month. The loss was intermittent and every few days several clots were passed. There was slight irregular fever and progressive anemia. There was a slight purulent discharge. Curetting and douches were employed and the discharges soon ceased. The blood count was 2,600,000 red cells; leukocytes, 12,800; ten days later the red blood count was 1,800,000; the leukocytes, 12,000. Thirteen days after delivery, thrombosis of the left femoral vein developed and examination of the blood showed the red cells irregular in shape

<sup>55</sup> British Medical Journal, January 4, 1919.



and size, many normoblasts and numerous platelets. This patient recovered rapidly in the open air, with plenty of good food, iron and arsenic. As in many cases the anemia here was due to a combination of repeated small hemorrhages and a mild sepsis.

The severe anemia of pregnancy follows the anemia commonly seen in the early months in which there is a diminution of red corpuscles, low hemoglobin and a slight leukocytosis, followed by a rise to nearly normal in the ninth month. Slight pallor in the early months is common and often associated with morning vomiting or dyspepsia; but this condition might pass on to a grave and fatal form, as was recognized by Channing and Lebert; but Gusserow's report of 5 fatal cases first attracted attention, the seriousness of severe anemia in pregnancy.

Osler quotes the case of a primipara in good previous health who had a tendency to anemia. The pregnancy was about six months advanced when anemia began and increased rapidly. The patient soon developed dyspnea, with swelling of the feet. Albumin appeared in the urine in large quantities. The blood count was red blood, 864,000; leukocytes, 13,360; hemoglobin, 20; color index, 1.12; lymphocytes were increased 30 per cent.; normoblasts were 6 per 100 leukocytes. The red cells were extremely irregular in size and shape. The patient was delivered spontaneously of a stillborn child of normal appearance for the seventh month. There was very little hemorrhage at labor and the patient was very little depressed. When seen afterward she was apparently well nourished, but had profound anemia. There were no internal hemorrhages. The case was regarded as a typical example of the so-called toxic or hemolytic anemia of pregnancy, and a favorable prognosis was given. The red corpuscles increased gradually to normal, leukocytes rose to 45,000 and fell to 3360. The normoblasts rose to 16 per 100 leukocytes and then disappeared.

Postpartum anemia is the most common of the anemias affecting child-bearing women. This may develop after a normal delivery without excessive loss of blood, the patient gradually becoming pale, and within a few weeks the blood cells may fall to 2 per c.mm. and anemia may progress and prove fatal in from eight to twelve weeks. A series of cases reported by Channing and the clinics at Zurich show the high mortality of this condition. Other writers give a more favorable report. Howard did not send such serious results, and in Osler's first series of cases the 5 postpartum cases all recovered. One was alive more than thirty years later and had passed through two subsequent pregnancies without trouble. He describes the case of a multipara, aged thirty-five years, who, after the birth of her fourth child without complications, began to nurse the infant, but gradually grew pale and weak and had frequent fainting fits and much shortness of breath. When admitted to the hospital, the anemia was so extreme that she could not sit up in bed without feeling faint. The red blood cells were 1,170,000, with extreme irregularity of many nucleated red cells. Hemoglobin was 15 to 18 per cent. Under proper treatment the patient made a rapid recovery. Osler calls attention to the fact that in severe anemia there is often continuous fever. This may be irregular and

associated with chills which might lead to a mistaken diagnosis of malaria. He describes the case of a primipara who had a difficult labor, after which she was normal for ten days. She then began to grow pale and grew rapidly worse; in the sixth week after confinement the red blood cells were 1,200,000; leukocytes, 15,000; hemoglobin, 15 per cent. The patient had a chill on the fourth or fifth day, in which the temperature rose to 103.4°, after which she sweated profusely. There was no discharge; no evidence of sepsis other than the fever and chills. The spleen enlarged, and as she lived in a region in which parturition was recognized as one of the factors determining the return of malarial infection, this was suggested as explaining the chill. The blood was negative during the chill and after. The red cells fell to 800,000 and the patient's condition was for sometime critical. Recovery was gradual and in four months she had nearly normal blood count.

**Inauguration of the School of Puericulture.** In the *Archives Mensuelles d'Obstétrique et de Gynécologie*, June, 1919, there is published an account of the establishment of this new institution. The opening ceremonies occurred in a large amphitheater of the Faculty of Medicine under the Presidency of Poincaré. This school of puericulture is under the control of the Faculty of Medicine of Paris. It is a French-American foundation independent and autonomous. Its purpose is to develop and to bring together the teaching of puericulture to physicians, students, midwives and nurses. It will also strive to create a permanent effort to spread abroad the knowledge of child-welfare work of all kinds. It will also make preparations from time to time for scientific research to improve the living conditions for mothers and children. The management rests in a Council of from 50 to 70 appointed by the General Assembly of the Association interested in the maintenance of the school. To join the Association two members must present the name of the applicant, which must be accepted by the Council. There is an annual subscription of 20 francs, or four dollars. If one wishes to register as a benefactor, the rate is 80 francs or twenty dollars. While charter members pay four hundred francs, or one hundred dollars. The establishment of this school is part of a movement resulting from the depletion of France by the conditions caused by the late war.

It will be remembered that early in the War the French Government subsidized pregnant women, voting a definite grant of money to them and establishing the regulations governing the conditions under which they were allowed to work in munition and other factories. The French took action early in this matter and have given much study and effort to preserving their population.

**The Protection of Maternity in Italy.** Laffont<sup>56</sup> publishes an interesting and suggestive report upon this subject. He describes the steady fall in birth-rate in Italy from 1861 to 1912. In 1861, the birth-rate was 37.6 to 1000 inhabitants; in 1912, 19.7. The Thirtieth Congress of Obstetricians and Gynecologists meeting in Rome, January, 1919,

<sup>56</sup> *Archives Mensuelles d'Obstétrique et de Gynécologie*, May, 1919.

took up this question and studied it in detail. They omitted no element which might be of importance. It was their opinion that the creation of obstetric centers should be carried out throughout Italy and that the country should be divided into segments, in each of which official obstetricians should be responsible for the population. The problems which have presented themselves to these obstetricians were important. The influence of alcoholism upon maternity; investigations into the health and condition of married women; the protection of pregnant women by the State; free hospital facilities and dispensaries for pregnant women; the organization of definite assistance for mother and child in each community. Instruction in clinics and universities in puericulture; instruction in elementary and normal schools.

It was found that there were three principal reasons for the diminution in the birth-rate: (1) Disease among women of various sorts and venereal disease in both men and women; (2) the voluntary limitation for prevention of conception; (3) the increase in criminal abortion. In addition to other important factors the Congress believe that young married women should in every way be prepared for child-bearing. The development of the skeleton should begin, if possible, while the girls are at school. Gymnastic exercises and proper position while studying are especially important. The results of the infectious diseases upon the genital organs, causing lack of development, dysmenorrhea and subsequent sterility, must be taken into account. Care of the young during puberty must not be neglected. The physiology of pregnancy should receive special attention and the hygiene of pregnancy should be carried out as completely as possible. The toxemia of pregnancy is a large subject requiring special attention. Observation shows that of late years there has been a marked increase in eclampsia, and many of these cases can be traced to the employment of pregnant women under bad conditions. The frequency of abortion is stated as 22 to the 100 by competent observers. The mortality of the newborn is as high as 4.39 to the 100.

Attention to the accidents and injuries which pregnant women sustain in occupations is of great importance. It is found that when women work where sulphite of carbon, benzol, dynamite and other such substances are employed that atrophy of the genital organs in young women often develops, and in others amenorrhea, dysmenorrhea and sterility. Other poisonous substances produced in manufacturing cause metrorrhagia and menorrhagia. These poisons may bring about abortion, fetal death, premature labor or weak or ill-nourished children. Lead-poisoning is especially fatal, producing abortion in 58 out of 100 cases and the death of the newborn infant in 78 out of 100, and of 21 infants born living and surviving, but 13 reached the second year. Mercury and phosphorous are also dangerous substances to pregnant women and to the fetus. It has been shown that of 1000 pregnant women working in chemical industries but 45 came to labor at term. It is dangerous for pregnant women to work in tobacco, and various authorities have urged that this be forbidden or that special precautions be taken. Traumatism is also a danger



and pregnant women should not use machines controlled by pedals or apparatus which brings strain upon the abdomen or exposes them to violent jolting. An injurious position while working may cause in women hernia and prolapse of the genital organs, premature engagement of the fetus and premature labor. When women sometimes work at the seashore standing in water for some time it may bring about abortion or premature labor. It is found that the number of cretins and imbeciles prematurely born are those born with hernia and with a disposition to nervous diseases is increasing. Congenital debility and prematurity cause 25 per cent. of the deaths occurring in the first year of life. The deaths of both mothers and infants in labor are far too frequent and the percentages much too high. The child-bearing woman requires special protection during the time of lactation. Her excessive work under unfavorable conditions may result in the death of the child and the permanent injury of the mother.

*Infant Mortality.* Any condition which interferes with the nursing of the infant by the mother must greatly increase infant mortality. It is estimated in Italy that from 1864 to 1911, 10,000,000 infants died during the first year of life. During the years which preceded the late war the mortality had fallen from 20 in 100 in 1880 and to 12.9 in 100 in 1914. Artificial feeding at best is a poor substitute for maternal nursing, and if 4 infants are fed artificially, 1 at the best calculation will die and the others have an excellent chance of acquiring rachitis. The development of the skeleton is often stunted by artificial feeding, puberty is delayed and the functions of the gastro-intestinal tract are interfered with. It is estimated that from 1864 to 1911 there were in Italy 1,858,327 infants stillborn and 9,595,415 infants dying before the end of the first year. In view of this tremendous loss of life and the greater losses of the recent war the Congress urges the profession of Italy to take every step to improve the population of the nation.

**The Sterilization of Women with Pulmonary and Laryngeal Tuberculosis.** Winter<sup>57</sup> contrasts sterilization and induced abortion in cases of tuberculosis of the larynx with reference to his experience at Königsberg. In 17 cases sterilization was performed in the first four months of pregnancy, and the results as noted were worse than in cases of induced abortion without sterilization. In the first stage cases 88.8 per cent. improved after abortion alone, and 75 per cent. after sterilization. In the second stage cases 80 per cent. improved after the abortion alone; 65 per cent. after sterilization. In the third stage cases 100 improved after abortion alone and 50 per cent. after sterilization. In order to compare these cases with strict accuracy it must be remembered that patients sterilized were frequently further advanced in tubercular disease than were those in whom only the abortion was induced. The authors studied all the literature of the subject, and his experience caused him to believe that sterilization should not be made a matter of routine for tubercular infection of the lungs and larynx, but that this operation should be done in cases of progressive

<sup>57</sup> Medizinische Klinik, July 27, 1919.

tuberculosis in which conception has occurred several times in the past and is likely to occur frequently in the future, and in which there seems to be no good reason for expecting a permanent arrest of the disease. If sterilization is decided upon, the *x*-rays may be the most conservative means and are to be recommended, provided that their sterilizing action can be depended upon in young women. The best time for the use of the *x*-rays is a few weeks after the completion of an induced abortion.

**A Hemorrhage from Rupture of Corpus Luteum.** Bartles<sup>58</sup> reports the case of a married woman, aged about thirty, who had nausea and vomiting, with sudden pain in the right lower abdomen. The symptoms pointed to appendicitis, and when she was brought to the hospital she was apparently menstruating. There was profound anemia and diffuse tenderness in the right iliac fossa, with dulness in the lower abdomen and tympanites in the upper part. The abdominal wall was so rigid that palpation was impossible. An examination through the rectum and vagina showed great tenderness on the right side of uterus and a large swelling behind it. The pulse and temperature were normal. Upon opening the abdomen there was free fluid and clotted blood in the peritoneal cavity. The right ovary was scarcely as large as a walnut, and on its surface there was a nodule the size of a pea from which the blood was oozing through a small opening. The ovary was somewhat hardened and the corpus luteum was swollen, with yellow and fairly thick walls. A very careful search with the microscope of sections made from the ovary revealed no chorionic villi. The hemorrhage was evidently from the corpus luteum without impregnation. The author also records another case in which a patient three weeks after her menstruation was taken suddenly ill. At operation there was much bleeding in the pelvis. The right ovary was as large as a hen's egg, from which blood was oozing. In the substance of the ovary was a cavity lined with lutean cells and with a small external opening. No embryonic tissue could be found on microscopic examination. In the absence of positive evidence of pregnancy the hemorrhage must be considered as coming from an unimpregnated corpus luteum.

In the observation of the reviewer an unmarried woman, who had led a very active and laborious life, at the age of forty-two years was taken with indefinite and diffuse pain in the lower abdomen. Pulse and temperature were normal and tenderness could not be definitely localized. Vaginal examination revealed a rounded swelling on one side of the uterus and a diagnosis was made of small ovarian cyst incarcerated in the pelvis. On section there was a considerable quantity of clotted blood in the pelvis and intestine. Both ovaries were as large as tangerine oranges and seemed to have been converted into a mass of firmly clotted blood. The peritoneum was blood-stained and in the wall of the uterus there were several fibroid nodules. Hysterectomy was performed, with removal of the appendages and appendix.

<sup>58</sup> Ugeskrift f. Laeger, June 5, 1919.

Microscopic examination of the specimens failed to show any cause for the peculiar condition present. The patient made an uninterrupted recovery.

**The Bacteria of the Vagina.** Loeser<sup>59</sup> divides the bacteria of the vagina into vaginal bacilli and pseudodiphtheritic bacilli. It is evident that when the biochemical contents in the tissue of the vagina change, bacteria that otherwise would remain latent might become active and pathogenic. There is no doubt that very important change in the vaginal flora may then result. This may be caused by the cessation of function in the epithelia of the vulva through some constitutional illness or some intercommunicated infection which may permit the sporulation of germs otherwise latent.

**Vaginitis Produced by the Trichomonas.** De Lee<sup>60</sup> has found that in these cases the patients complain of a persistent vaginal discharge, itching, insomnia, a sensation of burning and general malaise. On inspection the external parts of the vagina are reddened and the mucous membrane greatly roughened. Minute hemorrhages are often present; occasionally the cervix is involved. There is a profuse discharge of mucus and pus, thin, very irritating and of a disagreeable odor. It erodes the skin and in stout patients there is an obstinate and very foul intertrigo. Warts sometimes develop.

Under ordinary circumstances there should be no difficulty in diagnosis, but microscopic examination of the discharge makes the diagnosis positive.

In treatment, the vagina and vulva are first cleansed vigorously with tincture of green soap and water with a harsh cloth, in all the folds of the mucous membrane copious irrigation with sterile distilled water is then made. This is done three times, followed by a douche of 1 to 1500 bichloride of mercury, also with rubbing, the douche being given very thoroughly. Sterile distilled water is used afterward and the patient is kept at rest. On the next day a thorough cleansing is again made with warm water and green soap, the vagina is then tamponed with cotton saturated with glycerin and sodium bicarbonate 4 to 1. The mucous membrane of the vagina is distended by the packing and it is thoroughly rubbed upon the vulva. On the day following this is removed and a thorough irrigation with sterile warm water is given; twenty-four hours after this a microscopic examination is made of the secretions to determine the presence of parasites. In most cases the cure is complete.

**The Wassermann Reaction and Miscarriage.** Goodman<sup>61</sup> gives the results obtained in the studies of 1320 women who applied to the Sloan Hospital in New York for treatment. These women were pregnant and the Wassermann reaction was taken in each. There were 1159 negative cases, of whom 542 were primipara. Of the 637 who had been pregnant previously, 37 per cent. had aborted, 25 per cent. had had one abortion, 6 per cent. two, and 3 per cent. had three abortions. Of

<sup>59</sup> Zentralbl. f. Gynäkologie, 1920, No. 2.

<sup>60</sup> Illinois Medical Journal, March, 1920.

<sup>61</sup> Surgery, Gynecology and Obstetrics, April, 1920.



89 Wassermanns of 4+ positive cases, 30 were primiparæ, 59 had been pregnant previously, of whom 52 per cent. had abortion as compared with 37 per cent. of those giving a negative reaction. Among the 59 multiparæ with 4+ Wassermann reactions, 21 per cent. had had one abortion, 8 per cent. had two and 4 per cent. had three. In this series 292 women had 473 abortions, an average of 1.6 to each patient. There was one extraordinary case of a woman who gave a history of 16 abortions in 19 pregnancies, although blood examination, repeatedly made, always gave a negative Wassermann. Another patient had ten abortions previously, but in the eleventh pregnancy the Wassermann reaction was negative. No patient having 4+ Wassermann reaction had been pregnant more than six times. Among the 1320 cases there was only 1 who gave a history of having had syphilis; she had received treatment until her Wassermann reaction was negative. She had been infected by her husband, although during his married life he had had no signs of acute syphilis. The woman herself had no clinical symptom of syphilis. Her Wassermann was taken because a positive reaction was found in the husband, who sought medical advice for chronic headache. When conception occurred both husband and wife were receiving antisyphilitic treatment.

In 1320 pregnant women, 87 per cent. gave negative reactions to the Wassermann test, only 6.7 per cent. gave a 4+ positive reaction and 2 per cent. gave a Wassermann reaction of 3+. Among the negative multiparæ, 37 per cent. had had one or more abortions as compared to 52 per cent. in the 4+ cases. Among the 1320, but one woman was known to have been infected with syphilis, although approximately 1 woman out of each 11 gave a strongly positive Wassermann reaction, indicating that in all probability she had been infected. The husband was responsible in every case for the disease of the wife. The need for hospital treatment for syphilis in both men and women is manifested by the result of these researches.

**Influenza in Pregnancy and Childbirth.** Beuttner and Vulliety,<sup>62</sup> in 47 parturient women suffering from influenza, had a mortality of 23.3 per cent. This was greatest when pregnancy was interrupted by abortion or premature labor which developed as soon as the patient became ill with influenza. The mortality was greatest among young primiparæ. When influenza developed after labor it was usually mild and uncomplicated, and the writer thinks that the excess of leukocytes present, as a rule, after labor had much to do with the resistance shown by these patients. On this theory, influenza in pregnancy might be treated with a serum of parturient women.

Among the children prematurely born, the mortality was 60 per cent., and in those born at term 13 per cent. suffered from toxemia. So far as treatment is concerned, the indications are to prevent, if possible, the interruption of pregnancy, and in treating influenza to omit quinine and all drugs which are likely to stimulate the uterus to contract. Pregnant women should avoid all sources of infection, and conception

<sup>62</sup> Schweizerische med. Wehnschr., January 22, 1920.

occurring during an epidemic of influenza is obviously more dangerous than at other times.

**A Case of Premature Rupture of the Membranes and the Development of Decidua in the Mucous Membrane of the Cervix as a Cause for Hemorrhage during Pregnancy.** Schmidt<sup>63</sup> reviews the contribution of von Franque on the subject and describes a case occurring in the clinic at Bonn. The patient was a primipara, aged twenty-five years, admitted to the clinic because of vigorous hemorrhage from the uterus. Her previous health had been good; she had been married three years and had felt the movements of the child plainly. She had had hemorrhage at intervals which ceased spontaneously and then returned with considerable violence. She had no pain and the functions of bowel and bladder were performed normally.

On examination, the patient was well developed and fairly nourished, but the mucous membranes were pale. The urine contained neither albumin nor sugar, nor was there any evidence of syphilis or gonorrhea. The blood showed 3,980,000 reds, 10,200 leukocytes and 50 per cent. hemoglobin, with moderate leukocytosis. The fundus was two fingers above the umbilicus. The child was small but the heart sounds could be plainly heard. The external os was somewhat open and the finger could be inserted in the cervix 1 cm.; the internal os was closed. Examination increased the bleeding. When the cervix was examined with the speculum the mucous membrane was greatly thickened, red, and could be sharply distinguished from the bluish red in the membrane of the vagina. Hemorrhage seemed to come from this hypertrophied lining of the cervix. Under anesthesia, portions of this tissue were removed for examination. The wounds made in this manner were closed with catgut and a tampon of iodoform gauze was inserted. On the following day this was removed and later hemorrhage again returned, the tampon was replaced and apparently checked the bleeding. The patient improved, with normal temperature, but after a few days there was a discharge of amniotic liquid. Rest and opium were not successful in checking the pains, and labor developed, with the birth of a living female child of seven months development. The placenta was delivered one-half hour afterward. During the puerperal period the patient had moderate fever and very bloody lochia. A placental polyp was expelled spontaneously, when the temperature fell to normal. When the patient was discharged from the hospital the pelvic organs were in good condition. The external portions of the cervix were more open than normal and the wounds made by excising completely healed. The child died on the fifth day, apparently from weakness, and autopsy revealed no pathological lesions.

When the tissue removed was subjected to microscopic examination, it was found that the connective tissue was very edematous, its cells swollen and increased and that among the epithelia there was a broad zone of abundant infiltration with small cells, bloodvessels dilated and filled with blood. The pavement epithelia was changed to cylindrical

<sup>63</sup> Gynecologie, January, 1920, No. 1.

epithelia and these were in the connective tissue of the cervix and formed canals of glandular tissue. The whole picture was one of excessive cell growth and abundant development of bloodvessels.

The hemorrhage seemed to have developed from the extraordinary development of the connective tissue and membrane of the cervix as a reaction to the condition of pregnancy.

Examination of the membranes revealed abundant cell infiltration; this was in the form of inflammation whose greatest extent was at the lower extremity of the fetal sac. This was probably the result of infection from the vagina. The writer quotes a case of von Franque reported in 1912 of similar nature.

A review of the literature and bibliography accompanies the article which is illustrated with microscopic illustrations.

### LABOR.

**Breech Presentation.** Remy<sup>64</sup> gives the results of his experience in 24 cases of breech presentation. The pelvis and trunk of the child are delivered easily and rapidly when the uterus is contracting energetically. This renders possible the comparative easy delivery of the shoulders and head, and cases of this sort cannot be classed as fetal dystocia, but, unfortunately, this is not always the experience of obstetricians. In his 24 cases intervention was necessary in 11; this includes 4 in the group of 17 in which breech presentation was discovered comparatively early; the other patients were seen in consultation. In the first group it was usually necessary to interfere because expulsive forces of the mother were too weak. Of the 9 children in cases of inversion, 2 died and 2 other fetuses were dead when the case was first seen. In the 2 cases which proved fatal to the fetus, the mothers were primiparae and the breech of the child was arrested at the pelvic inlet. Under these circumstances the breech could not be reached by fingers passed into the groins. The author would endeavor to pass a fillet of bandage around the neck of the fetus; this is accomplished by using a strand of bandage or gauze which is passed around the neck of the fetus by a whale-bone applicator or bougie, and this was introduced by a whale-bone carrier; unfortunately, in 1 of the cases, this broke at the critical moment. The child was successfully extracted, but died during the intervention. In 9 cases ending in normal delivery 7 were primipara, but the uterine contractions and efforts at labor were so vigorous that delivery was comparatively easy. Intervention was required in 3 cases in which the contractions of the uterus and other muscles grew weak and the fetus was arrested at the pelvic floor, but delivery was readily effected by the usual method in 2 cases, 1 a primipara. The other fetus had died before intervention.

**Contra-indication to the Use of Hydrostatic Bags in Obstetrics.** Hull<sup>65</sup> believes that labor is frequently induced by physicians without regard to sufficient indications and with a resulting mortality and morbidity.

<sup>64</sup> *Revue Mensuelles de Gynécologie et d'Obstétrique*, April, 1919.

<sup>65</sup> *American Journal of Obstetrics*, March, 1919.



Labor is induced presumably as near term as can be estimated, and usually at a time most convenient to the physician and patient, the phrase "delivery by appointment" is often used to describe this method.

It is admitted that in some cases of accidental hemorrhage, eclampsia, incomplete placenta previa, dry labor, occasionally in overgrowth of the fetus in a number of pregnancies, the use of dilating bags may be properly indicated. If, however, these bags are improperly used they may greatly disappoint and cause pain and loss of life. Before introducing a bag for the induction of labor the obstetrician should satisfy himself that the cervix is dilatable with a bag and that there is good reason for believing that labor pains will be induced; in other words, one must guard against rigid cervix and primary uterine inertia. In 2 cases in the experience of the writer, bags were introduced and continuous traction with two-pound weight over the foot of the bed was made for twenty-four hours. All that was accomplished was some dilatation of the internal os with no thinning out of the lower segment and no dilatation of the external os. These patients were delivered by vaginal Cesarean section. Those who have used bags extensively can recall cases in which large bags have opened the cervix but in which labor pains did not develop, and it was necessary to deliver the patient by some form of operation. Rigid cervix is most frequently seen in primipara before the last weeks of pregnancy or when there is scar tissue in the cervix. A previous repair of the cervix has never caused this complication in the experience of the writer. It is difficult to foresee uterine inertia unless there is a history of this complication in previous labors. The use of bags is not contra-indicated where great haste is necessary, as in severe accidental hemorrhage, threatened edema of the lungs, tonically contracted uterus or acute failure of cardiac compensation. If labor is induced in the interest of the child alone the mother must be in such condition that she will probably live through the delivery; more rapid methods, such as vaginal Cesarean section, are better in these cases.

In contracted pelvis, with a true conjugate of 7.75, the use of bags is contra-indicated. In border-line cases the writer has discontinued the induction of labor and the use of bags; he employs the expectant method of treatment, combining diet and exercises with a trial labor, close watch of the fetal heart, rectal examinations and keeping the patient in condition for operative treatment, if necessary, and in this way obtained better results.

He quotes statistics giving a maternal mortality of 1 or 2 per cent., with a fetal mortality of 39.5 per cent. for the induction of labor. There is a considerable morbidity owing to lacerations of the cervix and pelvic floor. When one contrasts these results with the fact that in moderately contracted pelvis 80 per cent. of these patients deliver themselves, one can see that induction of labor in contracted pelvis is a mistake. Of the 20 per cent. requiring operative delivery, only 10 per cent. called for major operation, and if these patients were delivered by Cesarean section the maternal mortality would be less than by induction of premature labor and many more children would be saved. It is esti-

mated that in cases of pelvic contraction managed by spontaneous labor or section, the mortality of infants is only 4 per cent., while by premature induction of labor the mortality rises to 50 per cent.

In complete placenta previa with viable child, Cesarean section affords the only chance for the baby and is safest for the mother; the use of bags is contra-indicated; so, too, when there is virulent infection of the external genitals or vagina, a bag should not be used. It is urged in some quarters that labor should be induced at term by the use of bags, although the conditions may all be normal and promise a spontaneous natural labor. It cannot be denied that under the best conditions there is considerable danger in the use of bags; among these are infection, prolapsus of the cord, displacement of the presenting parts, abnormalities in mechanism and increased number of operative deliveries, asphyxia, atelectasis, prematurity and others. In view of these facts the proposal to induce labor at term by the use of bags as a matter of convenience cannot be recommended. Because an obstetrician who is especially skilled in the use of bags obtains good results, it does not follow that these would also be obtained by others who have less experience and are less skilful.

It is impossible to accurately determine the size and condition of the unborn child, nor can one accurately forecast the amount of resistance which will be offered by the pelvis and soft parts. Müller's method of pressing the head into the pelvic inlet with measurements of the head and palpation give a very fair idea of the size of the child, but size may not indicate maturity. One fetus may weigh five pounds at eight months and another five pounds at full term. The head measurements may be the same and the length of the child cannot be accurately determined before birth. Although we may measure the size of the head we do not know how well the head will mold or what will be the amount of resistance which the head may occasion during labor. We cannot also go by dates as to the time of full gestation. There is a difference of opinion regarding the exact duration of pregnancy and time of impregnation does not necessarily bear a direct relation to that of menstruation. We often have a patient go two or three weeks over the expected time of confinement and then give birth by normal labor to a small-sized child of normal measurements and development. The size of the child alone does not necessarily mean a difficult labor and very large children are not often seen. The argument that labor must be induced to avoid a large child is not reasonable. If examination indicates oversize in the fetus, the problem is practically the same as that of labor in a border-line pelvis.

Dystocia from the soft parts is much more frequent than from pelvic displacement; this is the most common complication of primiparous labor and differentiates it from labor in multiparæ. While a bag overcomes this resistance to some degree, it does not do it in the best possible way. The use of a bag alone will not perfectly dilate the parturient canal. The natural methods seen in spontaneous labor are necessary. During the last stage of pregnancy, the cervix thins out, the internal os becomes obliterated and the lower segment is

formed; when labor occurs, the cervical canal is obliterated and retracted, and the external os thins out and dilates. When dilatation is complete there is complete retraction and the cervix has lost its power to contract. When the cervix is dilated with a bag, it is not completely thinned and dilated and always offers some resistance to delivery. It remains thick and contractible and is not thinned out, retracted or paralyzed. When the uterus contracts, the cervix grips the presenting part and obstructs its advance, and if a forceps or breech extraction be attempted the cervix will grasp the head to be released only by laceration or incision. If one is using the bag, it should not be introduced before the lower segment is prepared, and, if possible, labor should be allowed to go on spontaneously. No one should make definite promises as to the health and vigor of the child born by induced labor. It is impossible to foretell whether the function of respiration and digestion will become successfully established, as we cannot determine in the unborn child the degree of vitality it possesses, we should hesitate to throw against it the burden of premature birth.

**A New Form of Obstetrical Delivery Table.** Ingrahm<sup>66</sup> believes that it is important to have a means for the mechanical control of a patient during delivery. Aseptic technic must be carried out, there must be adequate exposure of the patient, protection of the parts not aseptic and facilities for rapid change in the patient's posture. He describes a table in use at the Women's Hospital which he thinks fulfils these indications.

The table is constructed of 1½-inch enamel pipe, giving strength and lightness; its length is 5 feet, made of two parallel pipes, the lower 6 inches from the floor, the upper 12 inches above this. These join with an upright pipe or legs. At the foot the legs are continued or connected to the top of the table by a hinged joint making the table three feet in height; at the head the legs stop 18 inches from the floor, and this end is supported for the standard by a ratchet brace. The lower bar at the foot of the table gives support for the operator's foot. The top of the table is metal, 6 feet long. A nickel-plated bar is so adjusted to the table as to serve as a pulling bar and the length is such that it does not have to be adjusted for each patient; there is a sliding ring and strap on this bar for fastening the wrist, allowing free movement as the ring slides, and needing no further adjustment if the patient's position is changed. There is a device for applying shoulder braces so that the patient can be retained in position for manipulation. At the foot of the table are sockets or two leg holders, and these are firmly attached to the end of the table top and not to the sides, allowing the buttocks of the patient to be brought well over the end of the table. This relieves tension on the perineum and gives the operator free space for manipulations. At the foot of the table is a swinging tray, 19 by 13 inches, which can be swung in any position and used to hold sterile solutions or instruments; the baby may also be placed upon this tray after delivery. At the head of the table is another swinging tray,

<sup>66</sup> American Journal of Obstetrics, July, 1919.



11 by 16 inches, used for anesthetics. The Trendelenburg position, with a drop at the head of the table of 18 inches, may also be attached. This table has given most satisfaction after a thorough trial.

**Uterine Inertia Complicating Labor.** Broadhead<sup>67</sup> had an interesting case of uterine inertia in a multipara, with a normal pelvis, who had very short and easy labors, the last two one hour each. The patient stated the membranes had ruptured spontaneously two days before admission, and that on the night preceding there had been moderate hemorrhage. Pains had been present for more than a day, but the patient had been fairly comfortable. No life was felt on this day, although the fetal heart was apparently heard in the right upper quadrant. The cervix was long and soft and admitted two fingers; the presenting part could barely be reached by vaginal examination; on this account no positive diagnosis concerning presentation could be made. A slightly foul-smelling fluid stained with meconium was escaping from the vagina. The uterus was tense but not tender and no position could be made out. The patient's general condition did not indicate intra-uterine hemorrhage, but evidently inertia of the uterus, with a dead fetus, was present.

A large dilating bag was inserted and remained five and a half hours; it was then expelled, the cervix being about 4 inches dilated and loose cranial fetal bones could be felt. During the next eighteen hours there were no pains, the patient remaining in good condition. The cervix became dilated to admit four fingers; there was a foul discharge from the vagina and the vertex tended to rotate posteriorly. Three doses of pituitrin were given without result. As progress had failed craniotomy was decided upon, the blades of the cephalotribe were applied but slipped off, so the right foot was seized and easily brought down; traction on the macerated foot failed and the cervix was found thick and contracted about the thigh of the fetus. The patient vomited, had a chill and the rectal temperature was 102°, with a rapid pulse, backache and great restlessness. A hypodermic injection of  $\frac{1}{4}$  grain of morphine, was given. It was hoped that by rest and slight intermittent traction the cervix would dilate and delivery occur. Shortly after the patient had two hard pains and in five minutes the child was born. The fetus was not large, there was no hemorrhage and the patient was in good condition. Mild fever persisted for seven days, followed by complete recovery.

**Will the Use of Scopolamin-morphine in Labor Help to Improve the Birth-rate?** Greenwood<sup>68</sup> believes that the diminished birth-rate largely arises from efforts made by women to avoid conception and labor. Life of luxury and ease has much to do with this; these would have only as many children as they can well provide for. The physical condition of some is such that they should not reproduce and many women have a great dread of actual parturition. The increased prevalence of syphilis and gonorrhea tend to diminish the birth-rate. The writer analyzes these various points and finds that there has been a

<sup>67</sup> American Journal of Obstetrics, March, 1919.

<sup>68</sup> British Medical Journal, July 5, 1919.

reduction of one-fifth, or 20 per cent., in the number of stillbirths. Of his own cases 7 per cent. were induced to submit to pregnancy by the knowledge that they could have labor conducted practically without pain. It is estimated that if women were deprived of the fear of parturition there would be an increase of 70,000 cases.

As regards suggestions for improvement in this matter, the writer has no elaborate scheme. There must be no distinction between rich and poor, and all must be dealt with fairly. The writer would establish in all large towns, near some very quiet part, a combined maternity hospital and home. Half the beds should be reserved for those who could well afford to pay adequate fees, the remainder for those who perhaps could pay no fee, and there might be an intermediate grade between these two. All the patients in such an institution would have comfortable, and many of them private, accommodations, and the rooms should be charged for according to the degree of expense of the nursing forces. If a patient wished to have a nurse exclusively to herself an extra fee should be paid. There would be a superintendent obstetrician, with assistants, the number to be determined by the size of the institution. The success of this plan would depend on the enthusiasm, skill and devotion of the staff.

**Labor without Pain.** Metzger<sup>69</sup> reviews the methods in use to prevent pain during labor. He finds that the multiplicity of methods, the great number of substances devised for this purpose, shows that our knowledge is not perfectly classified nor are our methods always clearly indicated. All the various technics increase in some degree the risk for mother and child. The choice of anesthetic or analgesic should not be given to the patient but should remain in the anesthetizer's hands, and he should always give constant attention during its administration. These treatments demand hospital or clinic care, for it must be done carefully and with constant attention. Although we have considerable knowledge of the action of anesthetics and analgesics, still modern methods in the use of ether as devised by Lutzhoft, the mixture of Schleich or chloroform as used by Beruti, Fullerton or Hill have all been proved of possible value by experience.

**Extract of the Hypophysis in Obstetrics.** Pouliot<sup>70</sup> believes that pituitary extract may be valuable in operative shock; although in ordinary obstetrical operative work shock rarely develops, it is sometimes seen after prolonged Cesarean operations or hysterectomy.

Besides postoperative shock there are other conditions in which the arterial pressure, the vigor of the heart-beat and regularity and strength of the pulse are improved by extract of the hypophysis, such conditions are hemorrhage and acute anemia following delivery, placenta previa, uterine rupture and rupture of ectopic pregnancy.

There is a difference of opinion concerning the effect of hypophysis extract on postpartum hemorrhage; if this substance be injected in the beginning of labor it may occasion hemorrhage; if given late, some have reported uterine tetany and even rupture after its use. Some-

<sup>69</sup> Archives Mensuelles d'Obstétrique, June, 1918.

<sup>70</sup> Archives Mensuelles d'Obstétrique et de Gynécologie, 1919.

times syncope and high blood-pressure develop; these disturbances, however, have been observed in woman with heart disease, rigidity of the cervix or other conditions in which the use of hypophysis extract is contra-indicated. In secondary inertia of the uterus, regardless of the cause, and especially in cases of contracted pelvis, these substances have been considerably used. Its property of contracting bloodvessels makes it especially valuable in cases of puerperal infection. The development of puerperal septic infection can often be prevented if pituitary extract be given sufficiently to cause the uterine muscles to contract, and this may be true even when the infection has extended beyond the limits and has begun to develop into peritonitis. When death occurs in peritonitis the immediate cause is depression of the circulation, failure of the pulse, fall in arterial pressure and sub-normal temperature with accessory paralysis of the intestines, followed by absorption of toxins. The administration of pituitary extract combat both groups of this condition. The best preparation is the extract of the posterior lobe, and the best method of administration is by injecting deeply into the substance of the muscles.

**Obstetrical Anesthesia during Labor.** Palmer<sup>71</sup> gives the results in the use of nitrous oxide in the clinic of the Stanford University Medical School. He believes that it does not delay labor in the second stage and that it may be given continuously to a moderate degree of anesthesia for some time. Just as the child is born over the perineum a small quantity of ether should be used to secure relaxation. This should not be accomplished by decreasing the amount of oxygen administered, as this is always a dangerous practice, and especially so in parturient patients. It is much safer to add ether than to decrease oxygen. When it is necessary to relax the uterus, as in performance of version, gas with ether or ether and oxygen make the best combination. No relation can be traced between hemorrhage and the use of nitrous oxide and oxygen. This method tends to prevent lacerations, and, under favorable conditions, may be used for Cesarean section. When the writer's paper was written the cost of the gas necessary for a case was estimated at \$2.50, and that this sum would reimburse the hospital for the expense of the gas used for a given confinement.

**Examinations during Labor.** Jegge<sup>72</sup> states that in spite of the use of rubber gloves and all other precautions the puerperal period has a morbidity ranging from 5 to 20 per cent. He believes that this is produced by bacteria within the body of the woman herself, because it is absolutely impossible to make the vagina septic. He compares the result in 500 parturient women who were examined internally, with every antiseptic and aseptic precaution, with results obtained in 500 other patients in whom no attempt at internal examination was made. All these women gave birth to children spontaneously, and in none of these cases was the perineum lacerated. In the group that were examined the morbidity was much higher, and in both groups it was also much higher in primiparæ than in multiparæ.

<sup>71</sup> California State Medical Journal, 1919, No. 16.

<sup>72</sup> Correspondenz-Blatt f. schweizer Aerzte, July 10, 1919.



From his experience and that of others he believes that internal examinations should be made as rarely as possible. He finds that he can do surprisingly well without them. By palpation one can ascertain whether the head is presenting, its position and how far it has progressed in the pelvic cavity. If the patient is placed on her side and the hand of the physician is placed on the perineum with the palm of the hand on the lowest portion of the sacrum the finger tips between the anus and coccyx and pressure is made slowly inward and upward between pains, and if the physician then gives a somewhat abrupt and rapid pressure, the head of the fetus can be made out by palpation if it is in the pelvic cavity or at the pelvic outlet. By these manipulations one can find nothing if the head has not yet entered the small pelvis with its longest diameter. Should one of the patient's muscles make the test difficult, this can be avoided by asking the patient to strain. In cases in which palpation of the abdomen is impossible or trying for the patient, these manipulations are especially useful; in nearly 95 per cent. of his cases it gave the information desired.

An examination through the rectum will tell the degree of dilatation of the cervix very nearly as perfectly as examination through the vagina; occasionally patients complain that this creates a trying feeling of pressure, but it is not really painful. If the case is one which finally ends in Cesarean section this method of examination during labor is especially valuable, but, unfortunately, it tells nothing concerning the degree of dilatation of the external os. This latter factor can be dealt with by finding the contraction ring in the uterus by palpation, and in almost all cases this can be made out as a ridge or projection where the thin elastic lower segment joins the contractile muscle of the uterine body. The impression given by palpation on the lower segment is that of a thin elastic tube, and as this stretches its upper limit, marked by the ridge, goes upward, and this change in its position can be distinctly made out by palpation.

The writer states that the diameter of the external os increases with the height of the ring, when full dilatation is present the distance from the contraction ring to the external os is 10 to 11 cm., of this 8 or 9 cm. is above the upper margin of the symphysis, and this distance measured by finger-breadths may be represented by four. When the distance is measured by 3 finger-breadths the dilatation of the external os is the size of the palm of the hand. The os is fully dilated when this distance is the breadth of four fingers. The os is not larger than a 5-franc piece, about the size of a half-dollar, when the contraction ring cannot be found at all by palpation.

In 100 cases so tested this method of examination gave correct information in 91; in 4 per cent. it was a failure and in 5 per cent. there were good reasons why it did not give accurate information.

In a great majority of cases this method enabled the physician to avoid vaginal examinations during labor; certainly one should try them unless some condition arises which calls for the rapid ending of labor or there are some complications present which require special methods of treatment, or if the external examination gives only vague and not accurate information.

The writer believes that physicians and midwives do not realize how important, and even dangerous, internal examinations may be. This is especially true in complicated cases which may demand Cesarean section, such as placenta previa or pelvic contraction. There is always some risk about vaginal examination, and, except under the most favorable circumstances, it may be distinctly dangerous.

**Dilatation of the Cervix with Müller's Bag.** Müller<sup>73</sup> described the use of a bag which he had devised for the dilatation of the cervix and for the induction of labor. His bag resembles de Ribe's and has a clamp with a small wheel which can be attached to the bed. This enables a cord and weight to be used, the cord to be fastened to the tub connected with the bag, thus making continual tension on the bag. He has had, as a rule, success in exciting labor pains with this device. He allows the patient to expel the bag from the cervix and to bring it upon the pelvic floor. At times, during the progress of labor, he has found it useful to allow part of the fluid to escape and readjust the bag and then to fill it a second time. He has observed that its use facilitates dilatation of the pelvic floor and perineum. In 200 cases so treated he had no death from infection nor from any cause connected with the method. One patient was admitted infected and afterward died. There was moderate rise of temperature in some cases, which was relieved by purgation. In placenta previa in multiparæ it was usually possible to deliver the bag through the cervix in from one-quarter to one-half hour after its application. Version and extraction were then practised, followed by tamponing of the uterus and vagina. Hemorrhage was controlled with one exception, and that patient was a bleeder. In her case adrenalin was injected in the right and left sides of the vulva, with good results. The result for the mother depended on the duration of labor, when labor proceeded promptly and the child was not disproportionate to the mother, a good result obtained.

**New Points in the Mechanism of Labor.** Kehrer and Lahm<sup>74</sup> describe labor as the result of expulsive and resisting forces. They review the anatomy of the birth canal and also the various factors which are most important in the mechanism of spontaneous delivery. They call attention to the different ways in which crania of various sorts can enter a cylinder.

When the expulsive forces of labor act they show by decrement the direction of this force and its result as labor proceeds. They believe that when, from pathological conditions, the normal resistance of the soft parts of the birth canal is increased in amount, or in the direction in which this force acts, especially when the occiput encounters a resistance of the birth canal to any unusual extent, that this may be inferred from the shape of the head at birth. The high and overdeveloped forehead obviously will receive a greater resistance than a vertex. Such a condition sometimes pertains when the shape of the cranium is abnormal or when a tumor in the brain is present.

When the head primarily stands in such a condition of distinctive

<sup>73</sup> Zentralbl. f. Gynäkologie, 1920, No. 7.

<sup>74</sup> Archives f. Gynäkologie, 1920, No. 112, p. 524.

flexion that the anterior extremity of the fetal ovoid enters the birth canal there ensues a reversal of the usual mechanism. The vertex is forced more deeply into the pelvis, but a symmetrical engagement cannot develop, because the head, in beginning rotation, is not prevented from proceeding further by the resistance of the pelvis. Normally the head should descend in such a manner as to bring the greatest circumference in the most favorable position when the biparietal diameter will engage in one of the obliques and descend normally; when resistance is abnormal this phenomena becomes impossible. In some cases there is abnormality in labor because the child perishes and its tissues lose their normal elasticity. In any of these conditions deflection develops, and this may be produced by the abnormal shape of the cranium or development of meningeal tumor or tumors in the pelvis, scars in the external portions of the cervix and disproportion between the head and pelvis which hinders the entrance of the vertex. In other cases a swelling in the fetal neck, the coiling of the cord about the neck, some abnormality of the thorax of the child which prevents descent, may force the chin away from the thorax and produce an interruption in the normal mechanism, so an oblique position of the head may complicate labor.

The paper is minutely illustrated and is an interesting study in this important subject.

**The Frequency of Shoulder Presentation.** Ippolito<sup>75</sup> finds considerable variation in the statistics regarding the frequency of shoulder presentation in various countries. According to Cucci's researches in Italy, shoulder presentation occurs in 1.4 per cent. of the cases. In Austria, 0.71 per cent.; France, 0.66 per cent.; Belgium, 0.59 per cent.; Germany, 0.58 per cent.; England, 0.36 per cent.; United States, 0.35 per cent. In twenty years' experience in professional life in Sicily, shoulder presentation occurred only 12 times in 10,000 labors, which is 0.12 per cent. In trying to explain the cause of the variations in the frequency of shoulder presentation in different countries the author believes that ethnological and anthropological differences may account for these phenomena, especially as the dimensions of the xiphoid pubic space of the different races varies greatly and has something to do with this. If the matter is put in other phrases the frequency of shoulder presentation varies inversely with the mean stature of the race. In Italy this is 162 cm.; with the Anglo-Saxon in Britain and North America, 173 cm. Corresponding differences were found in the xiphoid pubic diameter measured from the base of the ensiform cartilage and the upper border of the symphysis pubis. Ippolito concludes that shoulder presentations among different nations varies inversely with the mean stature. As the mean stature increases the frequency is less. The greater frequency of this phenomenon among Italians as compared to other peoples is explained by the above law. The rarity of such presentations in Sicily in one town, Vara Franca, is apparently contradictory to the law just cited, but again it is explained by ethnological

<sup>75</sup> *Gaz. de osp.*, 1919, xl, 137.



and anatomical factors. The inhabitants are on the average of low stature. Among these people the xiphoid pubic line measures more than in taller races. The measurement of this line is important, and in obstetric practice should be considered nearly as valuable as the dimensions of the pelvis. In dealing with patients one must remember that shortening of the xiphoid pubic line is the correct evidence of inclination of the pelvis. From this may be caused abnormal presentations, and it is obvious that if the unnatural position of the fetus can be corrected, danger to the mother and child will thus be avoided.

**Unusual Complication following Normal Delivery.** Stein<sup>76</sup> describes a case of pseudomyelitis following labor.

The patient was a multipara, aged thirty-two years, with negative previous history. The first child had been born five years previously, with catarrhal infection of the eyes, which required prolonged treatment. For four months before her second delivery the patient was under observation and seemed to be healthy. Smears taken from the vagina were negative. The patient went into labor without vaginal examination and speedily delivered her child, the placenta following and the whole confinement being unusually normal. Immediately after labor, the patient complained of severe pain in the right ileocecal region, with fever and rapid pulse. These symptoms were maintained for nearly two months. The pelvic examination was negative and an orthopedic surgeon advised strapping the sacro-iliac joint, which gave some relief. The patient's blood showed the presence of *Streptococcus pyogenes* and was treated by serum. On the tenth day following delivery she had pus in the left knee-joint and made a very tedious recovery. She left the hospital unable to walk and because of pain in the sacro-iliac joints and when last heard from was still a partial cripple. Ultimately, she obtained a brace which enabled her to walk with the aid of crutches.

X-ray pictures showed no abnormality. Some time later the patient developed high temperature, rapid pulse and large mass in the right groin. There was swelling of the thigh. This was found to be a large extraperitoneal abscess. The patient was then operated upon and free drainage of the right sacro-iliac joint was secured, which was followed by a satisfactory recovery.

**Dropsy in the Unborn Obstructing Labor.** Dorland<sup>77</sup> describes the case of a young married woman, aged twenty-four years, who came into labor at seven and a half months with her first child. She had been well during the pregnancy, but no fetal movements had been observed for several days before labor. The patient was alone at the time, but labor went on naturally, and a somewhat undersized head was born immediately after the discharge of a small quantity of amniotic liquid. The mother attempted to extract the child by pulling upon the head, when she was horrified to find that it was separating from the fetal body; she pushed it back into the vagina and called for help. On examination the head was found almost detached from

<sup>76</sup> American Journal of Obstetrics, March, 1919.

<sup>77</sup> Ibid., April, 1919.

the body of the child tightly wedged in the superior strait of the pelvis. The arms could not be felt and a great cystic mass filled the pelvis, slightly projecting below into the dilated cervix. The abdomen was tense and greatly distended and no fetal structures could be made out. While endeavoring to carry the finger around the mass of tissue projecting through the cervix the patient had a severe uterine contraction and the cystic tumor burst, followed by the discharge of a large quantity of fluid; the fetal body was readily born, followed by the placenta, and the uterus contracted rapidly, but with very little hemorrhage.

When the child's body was examined it was found to be 40 cm. long, the head somewhat cyanosed in appearance. The arms and legs were small, not edematous and scrawny in appearance, and absurdly out of proportion to the immense, bag-like fetal trunk. A ragged opening was found in the torn tissue left by pulling off the head, and it was through this hole that fluid had escaped. An autopsy could not be obtained, but on examining the body through the opening in the neck the thorax and abdominal cavities seemed to be one. The diaphragm had been ruptured by the extreme pressure or there had been a congenital perforation of the diaphragm. The lungs, heart and great vessels were compressed into the upper thoracic region; they were not closely examined but seemed to be normal. The abdomen was immensely distended, thin, almost transparent and not edematous. The alimentary canal was normal except at the lower portion; the peritoneum had lost its glazed appearance and was covered at points by flakes of lymph. The rectum ended in a cul-de-sac and there was an absence of an anus. The bladder was small and apparently normal. The child was a male, and the urethral canal was almost impervious. Examination of the specimen showed that the condition was one of fetal ascites with chronic peritonitis, of which the cause could not be ascertained.

The writer reviews the literature of the subject, finding that some difference exists on the average age of the mother. They were usually about thirty years old. During pregnancy the health of the mother had been poor; all of the children had died, in no case surviving more than a few moments. Fetal deformities in this disease are rare. The fluid may contain mucus, while the placenta and cord are always markedly edematous, and microscopic examination showed destruction of the circulation and fluid exchange between mother and child. In the literature of the subject 15 different cases have been described.

The extreme distention of the uterus may induce uterine inertia, with prolongation of labor. Labor usually proceeds normally until the body of the child becomes wedged, when it ceases and operation is necessary. Most of the mothers recover.

Among the cases described are congenital polycystic kidneys, cystic degeneration of the fetal liver and cystic accumulation in the internal genital organs of the fetus.

The management of a case in which this complication occurs is comparatively simple. An effort should be made, by pulling upon the

presenting part, to mold the cystic tumor in such a way that delivery may be possible. The removal of the head or limbs often results, especially if the fetus has become macerated. If traction is unsuccessful, or if presentation is transverse, then the abdomen should be punctured under antiseptic precautions, or the thorax if the abdomen is not accessible; in puncturing the abdomen or thorax an ordinary obstetric perforator is very successful. If there are cystic changes in the liver or kidneys embryotomy will be required, with the extraction of the fetus by pieces until delivery is complete. Obstetric forceps are useless in these cases, and if the head has been separated from the body a perforator should be used at once. It is inadvisable to perform version; usually the fetal body is so large that it is impossible. When there is ascites and distended bladder it may first be necessary to puncture the abdomen and after that the bladder. It is very important that this condition be recognized early and prompt treatment instituted.

**The Persistence of Life in an Infant in a Case Where the Cord had Prolapsed and had Ceased to Beat.** Baylord<sup>78</sup> describes the case of a primipara, eight months pregnant, admitted to the hospital in labor with ruptured membranes transverse presentation and prolapsed arm. The midwife in attendance stated that she had heard fetal heart sounds very faintly. On examination the writer could not hear heart sounds. There was a left shoulder presentation, with prolapsed arm. In addition, the umbilical cord was in the vagina, flaccid and without beating. The writer hesitated sometimes to perform version, as the cervix was but partly dilated, and, at the request of the mother, baptized the child by sprinkling the prolapsed hand and arm with cold water; to his surprise he found that the infant was living. Version was immediately performed and the infant was extracted with some difficulty, but proved to be living. The mother and child made excellent recoveries.

The second case was that of woman, aged thirty-nine years, in her eighth pregnancy, admitted to the hospital with rigid os and membranes ruptured. The os was very large, thickened, indurated and lacerated, its condition suggesting malignant growth. As dilatation was partial the operator decided to wait for further progress. Dilatation progressed slowly, meconium was expelled and the heart sounds become irregular but could be made out. The writer completed the dilatation and, on examination, found a large mass of cord prolapsed, which did not beat, although the heart sounds of the fetus could be made out. The patient was anesthetized, the cervix dilated and an effort was made to apply forceps; the cord was caught by the forceps and side of the pelvis; the writer proceeded with the extraction, and, during the delivery, the cord ruptured. The infant, however, was delivered living and easily revived. The cord was flaccid, completely infiltrated with greenish substance and resembled a macerated cord. It will be remembered that heart sounds could not be heard and cord had ceased to beat.

The patient made a good recovery from labor but refused to submit

<sup>78</sup> Archives Mensuelles d'Obstétrique et de Gynécologie, May, 1919.



to hysterectomy, because of the suspicious condition of the cervix. It was interesting to note that in both cases heart sounds could not be heard nor could beating be found in the cord.

**The Influence of the War upon the Infant Mortality in France.** Chamberlent<sup>79</sup> was interested to ascertain the comparative mortality among the newborn in France during the years of the War. It was evident that all portions of France were not equally disturbed by the War and an effort was made to compare the infant mortality in various portions of the country, including those most disturbed, with the infant mortality which was recorded before the war and published in 1916.

Before the war the greatest mortality existed in the large cities, and the statistics for Paris gave 9.3 per cent. Cities of 100,000 or over, 6.9 per cent. Towns of from 30,000 to 100,000, 6.1 per cent., and villages and towns of 5000 to 30,000, 5.3 per cent. These figures are for 1896 to 1906. Then occurred a period when the hygiene of the country improved, maternity hospitals became more common, various general agencies were established for the protection of the pregnant women and pregnant women were given special medical attention, so that in most of the cities of France in the years immediately preceding the War the mortality percentage was lower. In Paris it fell to 7.5 per cent., in the large cities and provinces 6 per cent., and among rural populations 4 per cent. In some portions of France the mortality was as low as 2.3 per cent., while in the department of the Seine, the region of the Alps and coast towns the mortality was from 6 to 7 per cent.

In Paris fairly complete statistics are available regarding the mortality of the newborn during the years of the War, and this is largely owing to the work of Pinard. From August 1, 1913, to August 1, 1914, infant mortality in Paris was 7.69 per cent.; that is, of every 100 children born 7.69 were stillborn. During the four years following infant mortality ranged from 6.63 per cent. to 7.61 per cent. for 1917 and 1918. There was very little change in infant mortality in Paris during the years of the war, but, curiously enough, there was a slight diminution. At Tours, infant mortality fell from 9.1 per cent. in 1913 to 6.9 per cent. in 1918. At Nantes in 1912 infant mortality was 5.4 per cent. and in 1918, 4.2 per cent. In the city of Bordeaux in 1882 infant mortality was 8 per cent., this fell to 6.6 per cent. in 1910, and in 1913 it was still 6 per cent. During the war it remained at essentially the same figure. It is especially interesting to ascertain the infant mortality in towns and cities occupied by the enemy, and which suffered particularly during the War. At Lille, there was a mortality of 8 to 9 per cent. before the War. In 1912, the figure given was 8.93 per cent.; this increased until in 1917 11.05 per cent. was reached, this falling in 1918 to 9.6 per cent. On the whole, however, there was a slight diminution in infant mortality in Lille during the five years of the War.

It seems evident from these figures that infant mortality was influenced in a strikingly small degree in the large cities of France by the

<sup>79</sup> Archives Mensuelles d'Obstétrique et de Gynécologie, April, 1919.

War. When he seeks for the cause of this condition the writer expresses the view that it is largely to be found in the mental influence of pre-occupation, on pregnant women, that their anxiety for members of their family in the army and the necessity for work might have seriously injured the child, but, on the contrary, it does not seem to have had a very considerable effect. In the rural populations it is difficult to obtain precise statistics, but the department of the Girond, with a population of approximately 8,000,000, affords the same interesting statistics. In the years before the War infant mortality in this department was 4.8 per cent., in the five years from 1913 to 1918 this mortality continued at 4 per cent., but varied in the fractions of the percentage; on the average it remained exactly at what it had been before the War. The writer reaches the interesting conclusion that in spite of all the suffering and privation caused by the War infant mortality was influenced but little if any by this tremendous upheaval. These results are certainly a tribute to the French people.

In the *Journal de médecine de Bordeaux*, June 25, 1919, Chambrelent states that the infant death-rate, not among newborn, but among infants at Bordeaux, reached its lowest point in 1910 to 1912, namely, 10.9 per cent.; during the war it increased in 1918 to 23.1 per cent. At Toulouse a similar increase was observed, from 11.21 per cent. to 21 per cent. At Marseilles from 11 to 17 per cent., and at Rouen from 19.6 per cent. to 25 per cent. In Paris the infant death-rate progressively declined from 15.51 per cent. in 1913 to 13.96 per cent. in 1918. At Lille it was the lowest ever known, dropping from 20 per cent. in 1913 to 15.4 per cent. in 1918. Calmette ascribes this largely to the fact that factories were closed and that women remained at home with their infants and were obliged to nurse them, because cows' milk could not be obtained. The condensed milk given out first by the American Relief and later by the Spanish-Holland Relief was of great service. It was found that when condensed milk was used gastro-intestinal disease had not increased. Throughout the war dispensaries for infants and stations for the care of babies were maintained in Paris. The infant death-rate was the lowest ever known. As a siege had been feared a considerable number of cows had been procured and infants had more and better milk than usual; this precaution was not taken at Bordeaux and the infant mortality showed the results of the omission. Two institutions in Paris which cared for needy pregnant women were especially valuable. In one of these the mothers could bring her young children with her. There was a third institution, open day and night, to shelter any woman who was in need.

**Pituitary Extract in Obstetrics.** Schwaab<sup>80</sup> is strongly opposed to using pituitary extract to bring on labor. It does not shorten the process of abortion nor does it help in the expulsion of the retained placenta in abortion. The uterine muscle in these cases is too weak to respond to the drug.

<sup>80</sup> Presse méd., Paris, 1919, xxvii, 299.

The author does not believe that pituitary extract should be used during delivery at full term. When labor is much delayed because of uterine atony, without hemorrhage, pituitary extract has not the beneficial effect. It even tends to disturb normal contractions and to bring about contractions of Bandl's ring, with incarceration of the placenta. When there is hemorrhage at the time of delivery the use of pituitary extract is inferior to other methods of treatment. Ergot is better in Cesarean operations. When the urine is retained after labor pituitary extract gives excellent results. By its use the contractions of the bladder are stimulated and the use of the catheter is avoided. When weak solutions are employed hypodermically, Schwaab has never observed unpleasant results, but if large doses are given and intravenous injections are made, nausea, delirium and disturbance of the circulation and of the condition of the fetus are observed. Pituitary extract may also cause a tetanic condition of the uterus, either during labor or delivery. If weak doses are given this result is uncommon.

**Quinine in Place of Pituitrin.** Lautezin<sup>81</sup> found difficulty in obtaining pituitrin during the late war. Kalbin and Kohler, in Vienna, used quinine in place of pituitrin, and the writer has also repeated their experiments. He studied the action of this drug in uterine inertia during the period of dilatation during the last phases of labor, in abortion, retention of the placenta, stone of the uterus and artificial interruption of pregnancy. In several cases after pituitrin had been inactive, quinine in free doses produced a rapid effect after a few moments, when given by intravenous injection. When quinine is injected into the muscular tissue it acts in from ten to twenty minutes. Unlike the action of pituitrin, it seems especially valuable during the period of dilatation. It was uncertain in its action during labor as pituitrin is, but it was sufficiently helpful to replace pituitrin to a considerable extent. When quinine is pushed it causes vertigo, ringing in the ears, dryness of the mouth, itching or burning of the skin; symptoms of severe intoxication only appear after very large doses.

**The Influence of Quinine and Preparations of Hydrastes Kotarnin upon Uterine Contraction.** Rubsamen<sup>82</sup> has studied, by graphic methods, the effect produced by quinine and hydrastes kotarnin upon uterine contractions. The material embraced 40 cases. The records seem to show that quinine has the property of exciting uterine contractions, but to a very slight extent, and that it cannot be relied upon, and in some cases produces no result whatever. In testing hydrastes kotarnin he was unable to demonstrate any definite result during labor or in the puerperal period. These substances were far inferior to preparations of ergot or pituitrin. In ten to twenty-five minutes after intramuscular injections there was some increase in the contractions of the uterus, with shorter intervals between the muscular action. To some degree this substance resembles quinine or very small doses of hypophysin. It cannot be observed that any harm was done mother or child by these substances even if given in large doses. In cases of

<sup>81</sup> Journal Ge Skrift for Laeger, 1919, No. 25.

<sup>82</sup> Archives f. Gynäkologie, 1920, No. 112, p. 458.



hemorrhage it would be useless to rely upon their action, while even in larger doses they are not sufficiently powerful to influence labor.

**Syphilitic Changes in the Placenta and Umbilical Cord.** Schmidt and Baumlér<sup>83</sup> have examined the placenta and umbilical cord of syphilitic patients to determine the character and extent of pathological changes, especially as regards diagnosis by such examinations. The paper is illustrated by microscopic sections. The writers could find in their studies no positive evidence of such a condition as placental syphilis. It is possible that changes observed microscopically are results of fetal leukemia which produces the characteristic vesicular hyperplasia of cells. The occurrence of minute abscesses in leukocyte infiltration of the chorion and subamniotic tissue, and in the fetal vessels both of the cord and chorion, would give rise to a strong suspicion of the presence of syphilis. It is exceedingly difficult by examining the placenta and cord alone to make a positive diagnosis of syphilis.

**The Influence of Manifest and Latent Syphilis in the Mother upon the Fetus.** Lahm<sup>84</sup> reviews the literature upon this subject and has made studies by his own methods. He examined the placenta and umbilical cord in cases where the Wassermann reaction had been positive and found in the cord the characteristic changes in half of the cases. When syphilis in mother and child was suspected in the same proportion the characteristic changes were present in the placenta. Alterations in the placenta and cord were not present in precisely the same degree; when evidences of syphilis were found in the cord they were not infrequently absent in the placenta and the condition was sometimes reversed. In 100 cases in which syphilis could be absolutely excluded, inflammation was found in the cord in only one. There were no spirochetes found in this case, and the Wassermann reaction was negative. In one instance, in both umbilical arteries an exudative inflammation, in a very mild form, was present, the modification of the Wassermann test was positive and spirochetes were found in the cord. The placenta was negative. The child lived and both mother and child were apparently healthy. It would seem that in this case the changes in the cord were the first evidence of latent syphilis in mother or child.

It is comparatively rare to find spirochetes in the placenta or cord. In a later series of cases the writer found the characteristic germs in about half of the placenta or cords examined. It was, however, difficult to assert positively the characteristic lesions were not the result of toxic process instead of syphilis, and in some instances pathological conditions obscured the spirochetes and made them difficult to recognize. So, in examining the cord, inflammation of the cord might obscure the spirochetes. A typical case of maternal syphilis was described in which a woman gave birth to a dead and macerated child. Section upon the child showed characteristic gross lesions of syphilis, with spirochetes in liver, spleen, suprarenal bodies and intestines. In the puerperal period the mother had moderate fever, with a posi-

<sup>83</sup> Archives f. Gynäkologie, 1920, No. 112, p. 383.

<sup>84</sup> Ibid., p. 357.

tive Wassermann reaction. On examining the placenta the characteristic microscopic lesions were absent. There was cellular overgrowth and development of granular tissue.

He alludes to the two dicta which have been proved that syphilitic children of a syphilitic father may be born whose mother is free from all signs of syphilis. Such a mother is considered immune from external syphilitic infection.

**Prolapse of the Cord, without Pulsation, without the Death of the Fetus.**

Boero<sup>85</sup> has found in the literature the reported cases in which the fetus has been alive, although there was no pulsation in the umbilical cord and no heart sounds could be heard. One case is reported in which an obstetrician used a cranioclast because there was no evidence that the fetus was living, but on the birth of the child it was found still to be alive. The writer has practised for some years examination of the child's heart by introducing the fingers into the uterus over the heart or the epigastric region of the child, and thus appreciating even feeble contractions of the heart. To do this successfully the cervix must be very largely dilated, but it is a positive method of diagnosis, especially valuable in the absence of heart sounds or beating of the cord. In doubtful cases, where an obstetrician is about to perform embryotomy, this method should be chosen before undertaking the operation.

**Pregnancy and Labor Complicated by Atresia of the Vulva.** Micholitsch<sup>86</sup> reports the case of a young anemic woman, aged twenty-two years, who applied for medical advice to ascertain the presence or absence of pregnancy. The history showed that she had menstruated regularly since her fifteenth year. The quantity of discharge had never been excessive. Menstruation had often been painful and for three months there had been no pain. The patient had become exceedingly nervous, with attacks of syncope.

On examination the mucous membrane of the external parts was dark blue in color and showed no other abnormality. In making bimanual examination the vagina terminated in a sac about 1 cm. long and neither cervix or os uteri could be found. The body of the uterus was distinctly enlarged at the period of three months' gestation. Upon introducing the speculum no opening in this sac could be found, although at one point the mucous membrane was drawn in. Rectal examination showed a normally developed cervix with vaginal portion. A diagnosis was made of pregnancy complicated by a vaginal septum. It was thought that during pregnancy the opening in this septum had closed. The patient's history gave no clue to the condition for neither before or after marriage had she suffered from any disease of the pelvic organs and during childhood she had no severe infection nor wound of the genitalia. The avoid disturbing the pregnancy operation was postponed. The pregnancy developed normally and at the end of gestation a small opening appeared in the septum at the point where the mucous membrane had been drawn in.

When labor developed the period of dilatation was characterized

<sup>85</sup> *Semana méd.*, 1919, No. 26, p. 594.

<sup>86</sup> *Zentralbl. f. Gynäkologie*, 1920, No. 3.

by severe pain. The septum gradually dilated and became thinner and the opening enlarged somewhat; it was finally possible to introduce the finger and tear through the septum. On one side the unruptured membranes could be felt, also the partly dilated cervix. Soon after this examination the membranes ruptured and severe pains forced the head to the middle of the vagina. Labor gradually failed because of the excessive suffering which the patient endured. Forceps were applied and a well-developed male child was delivered. The puerperal period was normal. The child was nursed by the mother and both made a good recovery. Two months after labor the patient was examined and the remains of the septum could be distinctly made out.

An explanation of the condition was found in a study of the histological development of the genital organs.

**Tumors Complicating Pregnancy, Labor and the Puerperal Period.** Spencer<sup>87</sup> operated upon a number of these cases, of whom 3 died. One had obstruction of the bowel caused by occlusion of the ileum by two subperitoneal fibroids; this case was unique. In the other 2 deaths there were conditions which might have been avoided had a bacteriological examination of the tumor been possible before operation. One patient having a tumor had an abortion six days before admission, at the second month, and this was followed by an offensive vaginal discharge. Spencer removed a submucous myoma and a mass of infected decidua. After this the woman had two successful confinements. Finally her general health suffered with increased abdominal size and her general condition became poor. The tumor was irregular in contour, fixed and large, occupying the greater portion of the abdomen; there were signs of metastatic growth in the lungs. The diagnosis of sarcoma of the uterus was made; the patient died about twenty years after the removal of the fibroid.

**The Theory Concerning the Mechanism of Flexion and Engagement in Vertex Presentation.** Macias<sup>88</sup> believes, from a study of the literature of the subject and a review of observations previously made, that in almost all cases engagement is preceded by flexion. The two extremities of the head, in passing through the pelvis, encounter resistance which must vary greatly in different cases. It is scarcely possible that the head of a child at term could pass through a pelvis to the pelvic floor without becoming flexed.

Macias believes that the greatest fetal diameter presents in accordance with one of the obliques, and that is usually the left. In flat pelvis engagement must happen in a different manner. During the early part of labor he believes that the head of the child presents in a more or less non-typical way. It is hard to find a sufficient reason for denying that flexion follows engagement, and when the head engages without flexion it is observed that delivery is considerably lengthened.

Macias states that for the purpose of obstetric study the planes and axis of the pelvis which are important are those which have to do with the clinical strait, the axis of which is in front of the axis of the

<sup>87</sup> Lancet, February 21, 1920.

<sup>88</sup> De Torres Thesis, 1919.



classical strait, and from this it follows that the axis of the uterus is behind that of the plane in which the head engages. As the uterus contracts its force proceeds upon the obstetrical pelvic strait, with a certain inclination. When the abdomen is excessively pendulous this fact may alter the relationship. As the fetal head descends it finds an obstacle at the posterior extremity of the oblique diameter and turns naturally in the direction of least resistance. Flexion before engagement is caused by the fact that the resistance which the head encounters is unequal at its two extremities. Posteriorly there is resistance of bony tissue, while anteriorly the much less resistance of the so-called soft parts. The writer applies this reasoning to the different presentations. He believes that when the occiput is posterior there is considerable tendency to transform this into a presentation of the face, although this does not occur in every case. In occipito-posterior cases labor is slow because flexion is not well developed, and labor becomes more rapid as soon as flexion develops. The longest part of the occipito-posterior labor is the engagement of the head and its descent; when this has been accomplished rotation often occurs rapidly. When rotation does not occur in occipito-posterior cases flexion is always lacking. Width in the pelvis at the superior strait or comparatively small size in the fetal head not only does not help labor in these cases but often hinders it.

The writer holds that rotation occurs before engagement. The head of the fetus turns until the fetal diameter takes the transverse position afterward the occiput becomes anterior, while the remaining factors in labor then developed with surprising quickness. Obstetricians are sometimes deceived by apparent flattening of the pelvis, when what is present is not a narrowing in the pelvis but a posterior rotation of the occiput or an anterior presentation of the occiput without engagement because of the distended condition of the abdominal walls. In these cases the apex of the uterus is practically that of the superior strait, or may be in front of it, and this condition of affairs does not permit the necessary mechanism to develop which produces flexion and engagement. In flattened pelvis, when the antero-posterior diameter is lessened and also the oblique, the head turns into the transverse diameter, which is usually larger than normal; engagement occurs with flexion lacking, because the pressure is equal on the two ends of the transverse diameter; as the pelvis is usually symmetrical, the head remains in this position until the rotation of the head is caused by the rotation of the trunk of the fetus. Flexion may then develop and labor proceed.

**Chorio-epithelioma, Malignant.** Lunde<sup>89</sup> had an opportunity to study 38 of these cases. It is interesting to observe that 12 of these patients had recovered and remained well during the period of observation comprising eight years. Among the patients whose cases terminated fatally, 26 in number, there were 10 in which a hydatid mole developed, 4 in which the disease occurred after a premature birth, 8

<sup>89</sup> Zentralbl. f. Gynäkologie, 1920, No. 8.

after normal labor and 1 after an ectopic gestation. In the 12 patients who recovered the disease occurred 11 times after hydatid mole and once after a premature labor. After the development of a mole, bleeding is irregular and also after the expulsion of the ovum and fetus. Attention is called to the case and operation is promptly performed. Among the rare cases was one in which, after an ovarian pregnancy, chorio-epithelioma of the ovary developed, and there were 3 cases of ectopic chorio-epithelioma. One in which the growth developed in the brain, 2 in which the malignant growth occurred in the connective tissue of the vagina. In these cases after curretting, the examination of the specimen revealed the condition and the uterus was immediately removed, but in the uterus itself no evidence of malignancy could be found. One of these patients recovered, the other died from a general metastasis.

**Premature Separation of the Normally Implanted Placenta.** Alback and Ahlstrom<sup>90</sup> report 158 cases which are divided into three groups. In the first, the greater part of the superficial layer of the placenta was separated, a total of 58 cases. In 42 cases of the second group, the placenta was separated at the border; the third group of 58 cases showed a partial separation of the superficial layer of the placenta without development of clinical signs.

The maternal mortality of these three groups was respectively 8.7 per cent., 7 per cent. and 0 per cent. The mortality among the children was 75.44 per cent., 23.8 per cent. and 8.95 per cent. Albuminuria was present in the first group in 67.2 per cent., in the second in 0.33 per cent. and in the third 48.3 per cent. The writer examined 115 placentaë to determine the frequency of intraplacental bleeding and also its relation to retroplacental bleeding. He found bleeding into the substance of the placenta without separation in 293 cases, and in 37 cases there were small retroplacental hemorrhages. He found bleeding in the substance of the placenta in 27, and in 11 cases there were clinical phenomena of premature separation.

Eclampsia and albuminuria were frequent among these patients, hemorrhage occurred in about 40 per cent., and not quite half of those patients who had no symptoms of separation of the placenta had bleeding during or after the labor. The writer considers hemorrhage into the placenta as toxic in its origin, and it is evident that the uterine contractions may contribute to its development. In the treatment of cases in which there is considerable placental separation abdominal Cesarean section was the operation of choice.

Ahlstrom, in his experience, had found that bleeding into the substance of the placenta arose in cases in which there was degeneration with necrosis of placental tissue or that some inflammatory process was present. Simple hematomas without the development of marked symptoms are seen more frequently in primipara, while larger hematomas, with grave symptoms, are observed in multipara. In 5 fatal cases who came to section there was hemorrhage into the muscle of

<sup>90</sup> Zentralbl. f. Gynäkologie, 1920.

the uterus in 4. Violence, bodily or mental, rapid emptying of the uterus, polyhydramnia, twin pregnancy, overdistention of the veins of the pelvic organs are rarely causes for placental separation and of very slight importance in the etiology. Albuminuria is not infrequent, while in a small percentage extensive degeneration in the kidneys are present, and in some a trace only of albumin was found in the urine. The tendency to eclampsia was observed in 10 per cent. of 3000 cases on record at the hospital in Stockholm. The writer was convinced that albuminuria is a frequent and efficient cause for retroplacental bleeding, and calls attention to the fact that retroplacental bleeding and eclampsia often develop in common. Bleeding into the substance of the placenta is not infrequent in eclampsia or in the preëclampsic stage of albuminuria.

When there is retroplacental hemorrhage there is very likely to be bleeding into the muscular substance of the uterus. It is evident that any cause which increases the blood tension in the spongy vessels of the decidua of the placenta may predispose to hemorrhage. Many of these cases do not go to term, but pregnancy is interrupted in two-thirds, usually in the last three months and in 12 per cent. in the sixth or seventh month. In some cases hemorrhage occurs during labor from the exceedingly relaxed condition of the uterine muscle. In treatment the tampon should be avoided, for its action is uncertain and its presence is dangerous. Rupture of the membranes is usually efficient and is to be advised. When the hemorrhage is at all dangerous rupture of the membranes is not sufficient; dilatation of the cervix, with version and extraction, should be done. The use of forceps or embryotomy may be necessary.

When the cervix is undilated and the edges thin and resisting multiple incisions may be necessary. When the lower segment is greatly distended abdominal Cesarean section is safest. The maternal morbidity in this condition is quoted as 24 per cent., the fetal mortality 70 per cent., in some instances reaching 82 per cent.

In discussion, Hesselberg, of Christiana, gave his experience in 21 cases of premature separation of the placenta. One case followed an injury received a week before admission to the hospital. In 38 per cent. of these patients there had been a severe and persistent albuminuria, and if only those cases are considered in which extensive separations are observed the percentage of albuminuria reaches 62 per cent. In the majority of these cases the placenta separated before labor pains actually began. When the pains ceased during labor the indications were that uterus had ruptured rather than that the placenta had become separated. Maternal and fetal mortality are necessarily high.

**The Control of Hemorrhage in Cervical Placenta Previa.** Mathes<sup>91</sup> calls attention to the comparative rarity of cervical placenta previa and alludes to Schweitzer's collection of 22 cases. The maternal mortality is comparatively high and seems to lie in the fact that it is not so much the hemorrhage that is dangerous as the opening of vessels in the

<sup>91</sup> Zentralbl. f. Gynäkologie, 1920, No. 3.



uterus. When the placenta is expelled spontaneously, or removed by direct interference, the anatomy of the parts is such that there is nothing to adequately close these vessels and thus protect them from infection.

He quotes a case of a primipara, aged twenty-nine years, at the end of her pregnancy, who had severe hemorrhage at intervals for ten days, which ceased spontaneously when the patient was absolutely at rest. Two physicians examined the woman and made a diagnosis of placenta previa and sent her into the hospital. On admission the fetal head was movable at the entrance of the pelvis. The cervix was dilated. The external os partly open and placental tissue was found entirely covering the internal os. The patient had been prepared for Cesarean section, but examination caused such a furious bleeding that version was immediately done and the fetal body used to check the hemorrhage, and this proceeding was successful. Three hours later the breech of the child was expelled and the umbilical cord was pulseless. Preparations were then made for a total extirpation of the uterus through the vagina, and the patient placed upon the operating table and the child delivered by perforation of the after-coming head. Hemorrhage did not develop and an injection of pituitrin and extract of ergot were given and the placenta loosened; this caused a return of the hemorrhage. It was found that where the placenta was attached above the contraction ring it could be separated without difficulty, but it was so firmly implanted upon the cervix that it could only be removed in pieces. Dilators were introduced, the cervix grasped and drawn down when it was found the posterior cervical wall was exceedingly thin, rough and uneven, and that at the external os there had developed a loose portion of the decidua. At the moment there was no hemorrhage. This, however, soon returned as the placenta was separated. The uterus was finally tamponed firmly, although, its expulsive segment had remained, during the entire time, in a state of tonic contraction. The puerperal period was complicated by fever and two weeks after delivery the patient suffered angina and later developed pneumonia with pleurisy, from which she was ill for a long time.

The writer alludes to the modern method of delivering cases of placenta previa by section and relying upon the tampon to check postpartum bleeding. Obstetricians have often waited after the delivery of the child by version or forceps, hoping that the uterus would contract and that the placenta would be separated in the normal manner. The writers on similar cases emphasize the fact that one cannot expect so favorable a termination, while it is possible to make the expulsive segment of the uterus contract firmly; when the placenta previa is attached to the cervix it must be removed or the uterus must be extirpated. When removing the placenta from the cervix the parts should be completely exposed, and, if necessary, the cervix should be split in order that the bleeding may be completely controlled.

## PUERPERAL PERIOD.

**The Question or Early Getting Up after Confinement and After Operations.** Boucart<sup>92</sup> believes that the question of getting up after labor and abdominal section is a very complicated one. When should the patient's lying in bed cease and how early should she begin to get up. There are those who maintain that a woman who has been confined should leave her bed on even the first or second day, while others believe that at least one week should be spent recumbent. In cases that have been operated upon by opening the abdomen it is less difficult to make a decision because the elements which enter into the case are more definite and more easily ascertained. The writer states that the question of getting up after labor has passed through numerous phases, but recently the decision seems to have been made that a puerperal woman should leave her bed as soon as the lochial discharge ceases and certainly when to the disappearance of the red lochia is added the involution of the uterus, so that it is behind the symphysis pubes. Many obstetricians would add to this that the woman must have been free from fever, that the birth must have been spontaneous and not attended by lacerations.

The dangers of getting up after labor are thought to be embolism, hemorrhage, displacement of the uterus, such as retroversion or prolapsus. There are records of many cases illustrating these points and accounts of women who have died suddenly from embolism after getting up. It is true that the records of labor among savage and primitive races show that the woman with her infant in her arms may rejoin her tribe upon the march and seem none the worse for it. Other women in more civilized surroundings may have been delivered secretly from illegitimate pregnancy and immediately go on with their work, and they may escape complications; but these are held to be exceptions and the rule prevails that parturient women must remain in the dorsal position in bed during the entire period of involution if she is to regain her general health.

The reaction against this belief would go to the other extreme. In the last five or six years the time which a woman stays in bed has been steadily diminished. It is urged that by lying in bed women become anemic and the abdominal muscles atrophy; the lochial discharge is retained and this is favorable for the development of infection. It is said that involution of the uterus is retarded, the functions of the intestines are arrested, and complications, such as acute dilatation of the stomach, compression of the duodenum by the mesentery, retroversion and paresis of the bladder may develop. Further, it is stated that the function of lactation is diminished, that there is congestion in the abdominal circulation, stasis occurs, thrombi form and endogenous infection is brought about by diapedesis of bacteria, while the patient suffers from intoxication caused by the absorption of toxins from the intestines. The puerperal woman easily yields to these

<sup>92</sup> Archives Mensuelles d'Obstétrique et de Gynécologie, September, 1919.

influences, and, from the standpoint of economy at least, she should take her accustomed place in the household as soon as possible. Obstetric literature as far back as 1905 and 1906 abounds in reports of cases and in arguments urging the prompt getting up of parturient women. If, however, they are kept in bed certain measures must be taken to avoid bad results of recumbent posture. Some advise that the patient frequently changes her position while lying in bed, that she practises gymnastic exercises which cause the abdominal muscles to contract and that she assumes postures favorable for the involution of the pelvic organs. It is thought that the upright posture tends to prevent the passage of bacteria into the blood by promoting drainage of the uterus and stimulating the action of the bowels.

Some obstetricians assert that each case must be decided according to the condition of the individual patient. Some would ascribe the formation of thrombi to thrombokoniasis, a process which goes on in the organism at the moment of delivery. Some who urge early getting up would use adrenalin or eserine for their action on those nerve centers which supply the vasomotor and muscular tissue in the intestines. To avoid ptosis of the viscera into the pelvis and the occurrence of strangulation, especially of the mesentery and also rapid dilatation of the stomach, various forms of abdominal binders and bandages are devised.

Others favor the early getting up because the woman can thus return, to a large extent, to her usual life and because it seems to favor the nursing of the infant. Some authors urge that septic intoxication produces a peripheral paralysis of the capillaries, especially in the larger organs, which results in enormous congestion, and this is followed by anemia of the vasomotor and nerve centers; thus the use of adrenalin is indicated. In the opinion of some, early getting up favors the action of bacteria in the large bowel because of its prolapsus.

The writer has endeavored to ascertain the normal condition of the abdominal cavity at the moment of labor, and what may be the results, immediate or deferred, of the expulsion of the child, amniotic liquid and placenta. The writer reviews briefly the anatomy of the abdominal cylinders and the effect which may be produced by abnormalities in the muscular tissues of the abdomen. The circulation of the abdomen which plays a great part in the recovery of the woman after labor depends largely on abdominal equilibrium, as the uterus expels the child the intra-abdominal space is enlarged by the emptying of the womb; this disturbance of intra-abdominal equilibrium is compensated by the action of the abdominal muscles and by the gradual return to normal of the cardiovascular apparatus. This is what takes place among animals and must exist in the human subject. Unfortunately it is not invariably the case, and then occurs the disturbance of equilibrium in the abdomen without compensation.

The writer gives an illustration of a human body from which has been removed a large part of the posterior wall of one side of the abdomen, namely, the right. He finds that if external muscle pressure is deficient the sac formed by the tissues of the pelvis, abdomen and



diaphragm does not readapt itself normally to the condition of the intra-abdominal contents and abnormal conditions of this internal sac develops under the pressure of gas or the dilatation of the abdominal wall produced by feeble and imperfect muscular action. There occurs a marked venous stasis in the portal vein and also in the inferior vena cava; this portal stasis retards the function of the digestive tract and all of the viscera connected with it. The function of the nerve centers in the vasomotor ganglion controlling the abdominal viscera whose venous circulation depends upon the portal system are disturbed and a vicious circle results. To complete this there is a certain degree of ptosis of the liver, accentuated by the relaxation of the diaphragm which shows its effect in the inferior vena cava. There is renal stasis, uterine and peri-uterine stasis, as the veins in these localities are large and numerous, and finally there is stasis in the lower extremities. These changes may develop rapidly or gradually. Compensation may be brought about by a reaction of the internal muscular sac of the abdomen by the circulatory cardiovascular system, by a change in the position of the patient or by stimulation from the central nervous system.

The writer believes that deformity of the thorax, cardiac, pulmonary and diaphragmatic disease all predispose to prevent the return to normal intra-abdominal equilibrium. He mentions the various abnormalities in the abdomen and also in the muscles and fascia of the pelvic region.

The abdominal causes which predispose to this condition of disturbed equilibrium are early method of life, education, repeated pregnancies and labors, atrophy, deformation or dislocation of muscles, especially the muscles of the lateral surfaces of the abdomen, the oblique and transverse, hernia scars, obesity or excessive thinness, deformities of the pelvis and muscles of the pelvis. The condition of the peritoneum, such as exudate or adhesions, diseases of the liver, spleen, pancreas, abdominal tumors, lesions of the uterus and adnexa and affections of the nervous system supplying the vasomotor and whole nervous system must often be considered. He believes that abnormalities in the gastro-intestinal tract, whether of structure or function, are very important; especially does disturbance in function of the liver interfere with the coagulating principles of the blood and the formation of certain antitoxins which are produced in the liver. The general nutrition suffers from the condition of the viscera; the individual is less well able to resist infections, as all the functions are disturbed.

What are the effects, the writer asks, of early getting up? (Changing the position of the body increases muscular and cardiac action, and this in turn has an effect upon the digestive tract, kidneys and nervous system; these all bring about restoration of abdominal equilibrium, the most important factor in stimulating the functions of the organism. The writer analyzes the results upon various tissues and explains the benefits to be derived. The inconvenience of the vertical position can be considerable, and in some cases even outweigh the inconvenience and bad results produced by the dorsal decubitus, such are elongation

of the mesentery, increased pressure upon sutures placed in wounds or lacerations, the displacement of important supports of the uterus; on the contrary, early getting up stimulates the action of the bowels through peristalsis.

He shows that early getting up favors especially the restoration of the liver to the active function which it carries out before parturition, and this is true of the other organs or metabolism. The writer applies the same reasoning to cases that have had abdominal section. He places great emphasis upon the results obtained by abdominal massage after labor and after operations while the patient is in the dorsal decubitus. He has reviewed the literature thoroughly, and this with his own experience, leads him to believe that the choice is on the side of early getting up; this hastens the return to normal functions and to natural anatomical conditions. He would have the patient, while lying upon the back during the first part of her confinement, practise exercise of the abdominal muscles and he would give her abdominal massage, especially in the region of the liver, to establish the normal course of the blood and stimulate its physiological functions. He believes that it is of great advantage to reestablish the circulation through the liver and abdominal viscera before the patient gets up. This is also true of genital organs, and the treatment which is indicated to prevent abnormal conditions of the liver is also useful to secure a return of the pelvic viscera to a state of health.

Brouha<sup>93</sup> writes upon the same subject. He does not believe parturient women should remain too long in bed. During the first forty-eight hours after delivery he allows the patient to remain practically with little motion. He begins to favor action on the third day and in the morning and evening he has patients practise exercises which consist of circumduction of the lower limbs upon the pelvis and passive movements of the lower extremities, passive flexion of the trunk upon the legs, movements of resistance by the patient gradually rising and lowering the body and taking part in the exercises. While these gymnastic methods are employed the abdominal bandage is removed so that muscles may contract freely. These exercises are repeated on the fourth day; on the fifth day, when the patient has made these movements without difficulty, and when she can sit up, at least partly, without vertigo or increase in the pulse, the exercises are more vigorous and the patient is put for an hour on a comfortable couch with the abdominal binder retained; or if the patient is more comfortable without it the binder is removed. On the sixth day the gymnastic exercises are continued a little more vigorously and the patient is on the couch an hour in the morning and an hour in the afternoon. When she leaves the bed for the couch she makes some gentle movements of the arms and movements of the trunk on the lower extremities. On the seventh day she is no longer placed upon the couch but is helped to take a few steps and walk from the bed to the couch and remain out of bed two hours in the morning and two or three in the afternoon,

<sup>93</sup> Archives Mensuelles d'Obstétrique et de Gynécologie, September, 1919.

repeating movements of extension of the arms and reduction of the trunk as she changes from the bed to the couch, and she takes a few steps about her room. On the eighth day the treatment is made more vigorous, the patient is out of bed longer and walks more about her room. Early in the afternoon each day she takes two hours of absolute rest upon her bed. The patient remains in her room until the end of the third week; during these three weeks she alternates between gymnastic exercises and repose. She moves about the room and takes considerable care of her infant. Her complete recovery is not supposed to have occurred until at least six weeks after the birth of the child. The writer describes in detail the advantages which he thinks follow this method of treatment.

The reviewer has seen excellent results from massage and gymnastic exercises during the puerperal period. He has not begun them as early as the third day, but usually on the eighth or ninth. As the patient's strength returns, passive movements are especially valuable and aid greatly in bringing up the muscles. Considerable importance should be placed upon the posture of the patient; she should not lie upon her back for any great length of time but should repeatedly change to one side or the other, and after the eighth or ninth day she should take the knee-chest position ten minutes night and morning. As soon as the lochia grows scanty an examination should be made to determine the position of the uterus. If this is dropping backward in the pelvis with the patient in the knee-chest posture the uterus should be replaced. If air does not enter the vagina freely when the patient assumes this posture the nurse should be instructed to separate the vulva to promote the entrance of air. If this treatment was carried out with all puerperal patients, cases of retroversion would be considerably less frequent.

**Acute Anemia of Postpartum Sepsis.** Osler describes a case seen in consultation where, on the seventh day after delivery, the patient developed a condition of extreme anemia. She had not lost much blood at labor, but for some days there had been an unusually foul discharge. The red blood cells were 1,000,000; leukocytes, 20,000; anemia was unusually well developed and the patient's chief complaint was a painful throbbing of the abdominal aorta which beat with unusual violence. The patient died on the twelfth day. There were septic thrombi in the pelvic veins but no endocarditis. This case was unusually rapid in its progress, but similar cases have been noted. In one of Cabot's the red blood count was 800,000. Diphtheritic endocarditis was found at the autopsy, and if this had not been discovered the case would have been considered one of puerperal pernicious anemia, although every patient with puerperal fever is anemic, in only a few is the anemia so pronounced. Lee states that the loss of red cells may be at the rate of from 20,000 to 1,000,000 in a week and that the count may fall to 300,000. To illustrate this, Osler cites the case of a woman taken to a hospital for abortion in whom fragments of retained placenta were removed. The patient had a typical sallow, pale yellow tint of the skin. The red cells were



2,700,000; leukocytes, 8600; hemoglobin, 46 per cent. This patient improved rapidly and soon made a perfect recovery. The second case had been delivered of her eleventh child but had a severe septic infection, with high irregular fever and progressive anemia. Blood cultures were negative. The red cells were 1,580,000; leukocytes, 13,400; hemoglobin, 16 per cent.; color index, 48; the lymphocytes were in excess. There was a high percentage of lymphocytes. The red cells were very irregular in size and shape and there were many normoblasts. This patient died in a state of profound anemia.

A primipara was admitted a week after delivery with acute sepsis, high fever and offensive discharge. When admitted the patient was very anemic, with a sallow color and all the symptoms of severe infection. Streptococci were isolated from the blood and she was given antistreptococcic serum. The red blood count was 2,250,000; leukocytes, 9600; hemoglobin, 40. Anemia rapidly progressed; fever remained high and the patient shortly afterward died.

There is as yet no clue to the nature of the hemolytic agent in these cases. The clinical phenomena indicate poisons of the bothriocephalus. He believes that the profoundly changed metabolism of pregnancy and the intensely catabolic metabolism of the postpartum state result in the formation of toxins which are hemolytic. Although the anemia is progressive and often pernicious, it is caused by an agent which differs. When recovery takes place it is permanent and the woman may escape in subsequent pregnancies. In the second patient of his series she had an attack of great severity, recovered, had two children subsequently and lived thirty years after the attack.

The blood picture is of value in estimating the outlook. If signs of active regeneration are present, such as blood crises and a large proportion of red cells, with signs of recent formation and a basophilic granulation, the prognosis, while guarded, may be good. The number may rise from 1 per cent. to normal and 20 to 25 per cent. stimulation if bone-marrow be employed. In pregnancy in postpartum cases the high color index is the rule. The blood condition, however, is uncertain, for although the picture may be one of the most profound anemia, recovery after pregnancy may follow. As a rule, fatal cases are comparatively rare. Postpartum cases seem more fatal, and at times the most careful treatment has no effect.

Acute hemorrhage postpartum may be rapidly fatal from the reduction of the volume of blood, yet very large amounts may be lost, extending over several days, and recovery take place. In estimating the chances in these cases a fairly profuse hemorrhage is not the most important factor. If bleeding can once be checked, recovery is progressive and often surprisingly rapid. Repeated small losses of blood after abortion or delivery are often followed by anemia out of all proportion to the quantity of blood lost.

If the blood count is above 20 per cent. corpuscles and hemoglobin, fresh air, rest, food, iron and arsenic will give a good result. If the blood count is as low as 20 per cent. or less, transfusion may be employed.

**Sloughing Fibroid Complicating Puerperium; General Peritonitis; Hysterectomy; Recovery.** Kosmak<sup>94</sup> describes the case of a primipara admitted to the hospital with a history of bleeding. The cervix was soft and boggy, partially dilated, the membranes intact and a vertex presentation without engagement. A placenta could be made out in a low implantation. The patient's general condition was good and there was but little bleeding. On the following day, as labor progressed, very slowly a Voorhees bag was inserted, followed by delivery without interference. There was very moderate hemorrhage during the third stage and a tear in the cervix was repaired. After delivery the patient was very irrational and restless and a mass the size of the fetal head could be made out on the anterior vaginal wall. There was considerable shock requiring stimulation. The perineum sloughed, involution was deficient and there was always tenderness over the lower abdomen. The lochial discharge was foul, but apparently draining well. On the ninth day postpartum there was marked anemia, with hemoglobin 38 per cent.; 19,200 leukocytes. On the thirteenth day there was severe pain in the lumbar region and general peritonitis developed on the sixteenth. The lower abdomen, including the tumor, was very sensitive and the symptoms pointed to a sloughing of a fibroid. On vaginal examination the cervix was partly closed, there was no bulging in the cul-de-sac and a very slight serous discharge. Abdominal pain was severe and the patient was very restless. On abdominal section a gush of sercopurulent fluid escaped. The omentum was plastered down to the top of the uterus, in the upper portion of which was a tumor. Its capsule had perforated at several points and purulent matter was escaping. The intestines were bound together by light adhesions, with numerous flakes of lymph. There was a rapidly progressing peritonitis. Accordingly, hysterectomy was done, leaving the stump of cervix which was fastened in the lower end of the abdominal wound. Drainage was used. Her convalescence was retarded by great nervous disturbance with septic infection. She finally made a good recovery. Examination of the specimen showed a sloughing fibroid.

In discussion, Polak reported the case of a woman who had a spontaneous labor followed by postpartum hemorrhage. This required packing for its control. Two days afterward the cervix was fully dilated and a tumor larger than a fetal head and sloughing was presented. After some stimulation the patient was operated upon, the tumor brought out through the vagina and the uterus inverted; a rent in the uterus was found at the site of the tumor. The abdomen was then opened and a rapid hysterectomy done, leaving the stump outside of the peritoneum. After severe anemia the patient finally recovered. Other cases were reported in discussion illustrating the danger of sloughing of a fibroid of the uterus, which was the site of labor.

**Small Blood Transfusions in Blood-stream Infection.** Polak<sup>95</sup> has treated patients with blood infection by repeated small transfusions.

<sup>94</sup> American Journal of Obstetrics, March, 1919.

<sup>95</sup> Ibid., September, 1919.

This patient received general supporting treatment, fresh air, the Fowler position, abundant feeding, with the constant injection of bicarbonate of soda and glucose, which is kept warm as it leaves the container. Small transfusions of citrated blood were given every third day, care being taken not to use the same donor for more than two transfusions and 250 to 300 c.c. was given very slowly. The transfusion was preceded by a hypodermic injection of one-third of a grain of morphine. While this diminished the reaction there was some in 60 per cent. of cases. These blood injections were best given in the morning, when the patient's temperature was down.

The leukocyte count has been invariably increased by this treatment; the blood-pressure has been raised. Temporarily the red cells and hemoglobin have gained, but these have shown rapid destruction in the succeeding forty-eight hours. In the favorable cases, the pulse has always improved in quality and rate independently of any changes in the temperature.

**Mammary Abscess Treated by Aspiration and Pressure.** Gardiner<sup>96</sup> has treated 8 cases of mammary abscess by aspiration and pressure. Pus from 2 of these abscesses showed a mixed infection of staphylococcus and streptococcus, while in 6 cases the pus showed *Staphylococcus pyogenes albus* alone. Two of the women had the breast alone involved. The abscess was in the left in 6, in the right in 2, in the upper inner quadrant in 2, in the lower inner in 4, in the lower outer quadrant in 2. From this we observe that a left breast in the lower inner quadrant is more susceptible. The treatment was satisfactory and was appreciated by the patients because it left no scar. In 3 breasts there was no fluid after the fourth day. In 3 on the fifth day, in 1 on the sixth, and in 1 on the ninth. One patient had two succeeding abscesses which developed in the neighborhood of the original abscess, but it was possible to aspirate them through the original abscess cavity. When adjacent healthy tissue became involved it was easily recognized that the pressure exerted by the breast bandage prevented the usual profuse edema of the surrounding tissue. It was recognized that great care should be taken in preventing infection during pregnancy and the puerperal state. The *Staphylococcus aureus* is the organism most commonly found, usually entering by the milk ducts and causing clotting of the milk and abscess. Streptococci usually gain access through a lesion of the nipple. This spreads by the lymphatics, involving the interglandular cellular tissue. Cracked nipples are frequently found in streptococcus infection. It is believed that in the interests of mother and child a breast should be aseptically exhausted once or twice daily independently of the child's nursing. In mastitis, treatment by vaccines has not been very successful. After drainage is established vaccine may be used to better advantage. In treatment pressure is especially valuable, combined with cold or heat, and with local application of lead water and laudanum. The treatment of acute inflammation of the breast by producing artificial hyperemia has been

<sup>96</sup> American Journal of Obstetrics, November, 1919.



successful in some cases. If the incision is made it should be so done as not to cut the milk ducts. Drainage afterward may be filiform or by tube or gauze.

In some cases injection of air into the substance of the breast is of benefit. This is extensively employed by veterinarians. Aspiration and the injection of silver solutions has been successful in the hands of some.

In all draining by aspiration constant pressure was essential. The second aspiration is done four to six hours after the first. The quantity of fluid obtained at this aspiration will determine the frequency of the following aspirations: Needle punctures are made through the original puncture and always precede by local anesthesia. Cases so treated usually heal in from four to nine days. If abscesses form near the original abscess it is not difficult to ligate them, because the pressure of the bandage prevents any excessive edema, so that induration between the skin of the breast and the chest wall is readily recognized by palpation. This can usually be drained readily by aspiration. Contiguous abscesses can usually be emptied through the original abscess cavity. During the acute stage of mastitis, pressure should be constant and the bandage not removed, except for the briefest time possible, and pressure should be maintained some time after no fluid has been found. If there is no pus cold should be applied, but if pus be present, heat. It is observed commonly that prenatal care of the nipples fail to prevent the cure of sore nipples or breast abscesses in many cases. Patients should be warned to give prompt notice of any abnormality after nursing begins and the relation between mammary abscess carcinoma is one of importance.

**Care of the Bowels during the Puerperal Period.** McPherson<sup>97</sup> takes issue with the common view that all puerperal patients are constipated and all must receive purgative laxatives. He has noted, as have others, that purgation in the puerperal period often produces a rise in temperature. To test the matter, he abandoned the use of purgatives and laxatives in patients in one ward, but continued the usual treatment in another ward. In those who had no purgatives, three days were allowed to elapse after labor and then a low saline enema was given. This was repeated three days later, and this method was kept up until the patient left the hospital. Of 322 patients thus treated by him, 3 had fever, and of these 1 had mammary abscess. Of 322 patients treated by cathartics, 28 had fever at some time during the puerperal period. The cases were not selected and the patients were delivered by the same methods. There were no unpleasant symptoms in these women not receiving cathartics such as foul breath, headache, coated tongue and breast complications.

To make more extensive investigation, these methods were tried in 589 cases without catharsis, and in 578 with ordinary catharsis. In the second series among those who had catharsis 56 had fever, a proportion of 9.6 per cent. Among those who had no catharsis, 50 had fever, 8.6

<sup>97</sup> American Journal of Obstetrics, December, 1919.

per cent. Among these were many conditions to cause fever, such as foul lochia, acute coryza, gall-bladder infection, pyelitis and infection of the breasts.

If the total number be taken of 900 who had routine catharsis and 911 without, of those who had catharsis 84 had fever. Among those without catharsis, 53. If the placenta cases were studied on this ratio it would be found that catharsis produced fever twice as frequently as its avoidance.

**Abscess of the Ovary and the Corpus Luteum.** Chame<sup>98</sup> has found in literature isolated cases reported of puerperal ovaritis. The writers ascribe the occurrence of this condition largely to the puerperal state. Some admit the possibility of infection of the corpus luteum.

The writer studied 17 cases of suppuration of the pelvic ovary and specimens obtained from the Tarnier clinic. These were in puerperal cases and much of the interest of his research lies in the fact that it proves distinctly that the puerperal period may have nothing to do with the occurrence of this condition. At the same time it must be remembered that in the majority of cases the puerperal period is an important factor.

The writer concludes that abscess in the corpus luteum is a characteristic of non-puerperal cases. The history of puerperal cases would indicate that the stroma of the gland and its surrounding lymphatics were usually involved.

**Puerperal and Surgical Infections.** Wallich<sup>99</sup> compares puerperal and other surgical infections. In puerperal cases we commonly recognize two types of bacteria, one localized on the surface of the uterus and in its wall, the other generalized and involved in a diffusion of the infection. In both types the streptococcus is most frequently present. In the post-partum uterus the conditions are much that of wounds seen in the recent war. Tissue is breaking down and infection finds a favorable breeding ground, and in these lesions in both classes of cases streptococcus is an important factor. If the localized war wound infection became generalized one observed the same phenomena as seen in puerperal infection. The treatment which was successful in infected war wounds can be applied to puerperal sepsis. Intermittent, and especially continuous, irrigation of the uterus after the methods of Labarraque, Carrel and others, which have proved so successful in war wounds and used only recently in the uterus. As the surgeon in war removes with his bistoury dead tissues in the infected wound, thus preparing the wound for primary union, so the obstetrician with the curette in the puerperal uterus removes infected decidua and infected tissue and hastens the patient's convalescence.

Military surgeons have derived great benefit from the knowledge of the pathology of puerperal infection and its most successful treatment, and our methods, successful in infected wounds in war surgery, have been satisfactorily applied to puerperal septic infection. Both surgeons and obstetricians agree that removal of the focus of infection should form the basis of treatment.

<sup>98</sup> Archives Mens. d'Ostét., March, 1919.

<sup>99</sup> Presse méd., 1919, No. 27, p. 162.

**Puerperal Gangrene of Both Legs Extending to the Knees; Double Amputation and Recovery.** Hicks<sup>100</sup> reports the case of a patient, aged twenty years, delivered normally. She had always been well and had previously had two children, and the puerperal period following the present labor was normal. Four weeks after her confinement there was pain in the feet and ankles, with swelling of the ankles, tenderness and the presence of vesicles. This became worse, with pain and burning in the feet and legs. In two weeks the process had reached the point where the toes were enlarged and cold and becoming purple. Severe pain was felt in the ankles, radiating up the legs. Gangrene had begun in the toes, first in the left foot, and spread to the ankles and legs gradually. The urine, after repeated examination, was normal.

When admitted to the hospital her temperature was 100.5°, pulse 110, soft and regular. The uterus was in normal position, fairly well involuted and there was lochial discharge. Marked swelling, with tenderness, coldness and vesicles, was noted in both feet and legs. The color was normally black, shading at the knees to dark purple. A faint line of demarcation had developed near the tubercle of the tibia. There was considerable pain in the knees and calves of the leg. The left leg was first amputated above the knee, and as this operation was well borne, the other was amputated two days afterward. The pulse and temperature immediately became normal. The patient made a good recovery, the wounds healing without infection, and the patient was convalescent in two weeks after operation.

**Puerperal Emphysema.** Luengo<sup>101</sup> reports the case of a patient, aged about forty years, who had given birth to her third child three weeks previously. The puerperal period had been apparently normal, the woman getting up about five days after delivery, but having felt a dull pain in the left lower abdomen. She was suddenly taken with great difficulty in breathing, high temperature and sharp pain in the back, side and right portion of the chest, without cough, expectoration or physical signs of pneumonia. These symptoms continued with varying degree for eleven days, when the temperature fell; the patient suffered from persistent cough, with a blackish bloody expectoration. A week later she was seized with thrombosis in the femoral vein and eight weeks later in the leg on the other side. After all these complications had subsided somewhat, at the end of the sixth week there was another attack of emphysema in the lung which also subsided. The woman was kept in bed for three months and apparently made a recovery. Various forms of treatment had been employed, including serotherapy. Strangely enough the blood continued good throughout the illness and the patient's general condition was remarkably good. Evidently no great septic element could have been present.

**Abnormal Fat Content in Breast Milk.** Slawik<sup>102</sup> gives his experience in the hospitals in Prague in observing breast milk which was above the average in fat. If a large series of patients be examined it will be found

<sup>100</sup> West Virginia Medical Journal, 1919, No. 13, p. 337.

<sup>101</sup> Siglo Medico, January 18, 1919, No. 3397, p. 66.

<sup>102</sup> Deutsch. med. Wehnschr., January 13, 1919.



that certain women continuously give milk that has much or too little fat and that the infants suffer from this condition. When fat is in excess, vomiting develops soon and persists. The child vomits at once a considerable quantity after almost every feeding, although there is no evidence of overfeeding or spasm of the pylorus. These infants begin to lose appetite for breast milk and will take only small quantities, becoming pale and lethargic, with flabby muscles. Sometimes obstinate constipation is present or diarrhea with thin and odorless stools, which later are rancid and thick. The condition is different from that of an infant who is unable to digest food but who is receiving a breast milk containing the average quantity. As regards treatment the diet of the mother should be controlled. She should be given food poor in fat, encouraged to take active or passive exercise, and, if necessary, breast milk may be pumped from the breast and diluted.

In the experience of the reviewer a very simple and efficient method of controlling this condition consists in massaging and pumping the breasts before the child nurses, abstracting as much milk as possible with a breast pump. The remaining milk will be less fat and more easily digested.

**The Relation of Puerperal Infection to Polypoid Decidual Endometritis.** Nyulasy<sup>103</sup> believes that polypoid decidual endometritis with or without adherent placenta is a very frequent cause of serious puerperal infection. The diseased membrane may assume the polypoid or papillomatous variety, with abundant outgrowths, especially from the site of the placenta. In other cases the lining of the uterus is merely thickened and uneven and a particular type seems to depend upon the extent and distribution of the interstitial fibrous tissue of the uterus. Abortion often results from this condition, but the most well-developed cases are found after labor at full-term. As can readily be imagined this condition often causes adherent placenta. Clinically speaking this diseased decidua is very liable to become infected and may readily lead to septicemia, thrombophlebitis or some other very serious complication. Microscopic examination of decidua discharged or removed by the curette will give positive evidence of the presence of this infection. The indication for treatment is clear, to remove the diseased membrane as steadily, promptly and as completely as possible.

**Tumors Complicating Pregnancy, Labor and the Puerperal State.** Spencer<sup>104</sup> in his Lettsomian Lecture gave an account of 55 oöphorectomies for ovarian tumors complicating pregnancy, labor and the puerperal state. He has seen 2 other cases, one of which died on the third day of the puerperal period from a rupture of a large cyst, the other, a patient who had an ovarian tumor as large as a lemon, who suffered no inconvenience from its presence and declined operation. The ages of these patients varied from twenty to forty-three, the average being thirty. These patients had 150 children, an average of nearly three, before the tumors were removed. Abortion occurred in 26.5 per cent. of these pregnancies. Forty of these women were not operated upon during the

<sup>103</sup> Medical Journal of Australia, March 22, 1919.

<sup>104</sup> British Medical Journal, February 21, 1920.

pregnancy and 15 were. In only 5 of those not operated, or 12.5 per cent., abortion occurred in the pregnancy which preceded the ovariectomy. Of the 15 cases operated upon during the pregnancy, 4 aborted, 26.6 per cent. One had bilateral dermoids removed at the twelfth week, one had bilateral fibroids removed at the fifth week, another had hemorrhage before the operation at the thirteenth week, when a large multilocular cyst was removed and the patient expelled a blighted ovum twenty-seven days afterward. The fourth patient had a parovarian cyst with twisted pedicle and hemorrhage into the broad ligament. The tumor was removed at the thirteenth week of pregnancy, two hours after the twist of the pedicle developed. In two-thirds of the cases pregnancy continued and living children were born, of whom one died shortly after birth. The tumor was cystic adenoma in 60 per cent.; dermoid in 22.2 per cent.; fibroid in 5.4 per cent. and parovarian in 10.9 per cent. The pedicle was twisted in 32.7 per cent. Rupture of the tumor occurred in 5.4 per cent., once probably in labor. In 8 of these cases suppuration occurred in the tumor, and this developed after delivery. The right ovary was the site of a tumor more often than the left in 23 cases, while the tumor was in the left ovary in 18; in both ovaries in 8. In the parovarian in 4 and incarcerated in the pelvis in 5.

It is thought best to replace a tumor prolapsed in the pelvis, if possible, and so to allow the birth of the child to occur through the vagina. The tumor can be removed subsequently in accordance with the indications. Adhesions complicated these cases in 47.2 per cent.

There was no evidence that these tumors grew with special rapidity during the pregnancy. It must be remembered that ovarian tumors in non-pregnant women frequently grow very quickly.

Of the 55 patients operated upon, 1 died. She had a dermoid cyst and had been delivered eight months before operation. She suffered from indefinite abdominal pain, and at operation the Fallopian tube was almost divided, possibly by a twist in the pedicle of the tumor. After the operation, obstruction of the bowel developed, causing the patient's death. Of these operations done during pregnancy, 15 in number, 12 were performed during the first half, 2 during labor and 1 immediately after Cesarean section at term. In 2 labor was induced for contracted pelvis. All these mothers recovered. Thus of the 19 cases seen during pregnancy, all of the mothers recovered; 15 children survived.

In 2 cases a transverse abdominal incision was made, but this is considered rarely to be the incision of choice. Silk was used exclusively for ligatures and buried sutures. Forty cases were not operated on during pregnancy, and all of these women recovered from labor or abortion.

Among these 55 patients there was no instance of malignant change in the ovarian tumor. In non-pregnant patients having ovarian tumors, malignancy is found in not more than 20 per cent. Symptoms may not develop in these cases unless strangulation or inflammation occur.

The diagnosis should ordinarily not be difficult. In early pregnancy with small tumor it may be hard to make out the tumor. In the second

half of pregnancy positive evidence is usually present of the existence of a living child. Should polyhydramnios be present, diagnosis may be difficult. Heger's sign sometimes leads to confusion as the body of the uterus, when this sign is elicited, may seem to be separate from the cervix and may be mistaken for an ovarian tumor. In ectopic pregnancy, or pregnancy both intra- and extra-uterine complicated by ovarian tumor, diagnosis may be difficult. In all doubtful cases examination should be made under anesthesia. If this tumor be ruptured symptoms will depend upon the nature of its contents. Some patients suffer but little from rupture of such a tumor, while in others shock, pain, vomiting and peritonitis rapidly develop. If the tumor be multilocular the unruptured portion can still be felt and there are signs of free fluid in the abdomen. When free fluid can be detected in the abdomen and there is no sign of disease of the kidneys, liver or heart, one must always suspect ruptured ovarian cyst.

So far as treatment is concerned removal is recognized as indicated. The obstetric side of the case should not be neglected, for some of these patients have contracted pelvis, and this condition may greatly modify the treatment selected. In the first half of pregnancy all tumors should be removed, with the following exceptions: Lutein cysts complicating blighted ova. These frequently disappear spontaneously. If the patient be childless, bilateral tumors which cause no symptoms should be allowed to remain, or, if operation be done, part of the ovary should be left behind. Primary adherent malignant cysts should not be removed nor should secondary malignant cysts. During the second half of pregnancy all large ovarian tumors, or those ruptured, inflamed and strangulated, should immediately be removed. Small tumors which are in the abdomen, or which can readily be pushed out of the pelvis, may be allowed to remain if they cause no symptoms. Small tumors incarcerated and not easily replaced should be watched and removed at the end of pregnancy or toward the end of the first stage of labor. If there are adhesions or solid tumor, Cesarean section should be done. The precaution should be taken in operating during pregnancy to tie the vessels of the pedicle separately. The pedicle should be ligated as far as possible from the uterus and morphin should be given to prevent labor.

During labor the tumor should be removed if it is complicating delivery and while this is being done a second operator may deliver the child if possible by forceps. When tumors are solid or adherent, and labor develops and the tumor is in the pelvis, Cesarean section may be necessary. It is sometimes best to evacuate the tumor by incision and pack it with gauze and then deliver the child through the vagina, removing the tumor as soon as possible afterward. Vaginal ovariectomy is not to be preferred to that by abdominal section. Under no circumstances should induction of labor, the use of forceps, version or tapping of a cyst be done. In the puerperal period ovarian tumors should be removed as soon as possible after delivery, usually within twenty-four hours. If there is a suspicion of puerperal sepsis a delay of a week or two may be advisable unless signs of strangulation or infection of the tumor arise.



**Regarding Polyneuritis.** Valberg<sup>105</sup> described the case of a woman, aged thirty-four years, who at each of three childbirths had a return of toxic polyneuritis. When not in a pregnant condition she was without a trace of the affection. Among her other symptoms she had paresis of accommodation and all the limbs were paralyzed. The time at which these symptoms developed varied in her different experiences, being five weeks, three weeks, or eleven days after delivery, and the patient was ordinarily well in ten to eight months. Otherwise the woman was healthy and no trace could be found of exogenous toxic action.

In the literature Valberg had found 7 cases like his, but, unfortunately, but one of them was accurately described. In 2 the polyneuritis developed during the pregnancies. In the other the arms alone were affected. Valberg's case was the severest on record. He calls attention to the fact that there is great similarity in the clinical phenomena in each attack. It seems as if the special nerves involved are constitutionally inferior to normal nerve tissue or else are exceptionally susceptible to the toxin which produces neuritis.

**The Analysis of Human Milk.** Talbot<sup>106</sup> believes that when an effort is made to examine human milk there is often error in the method employed of obtaining the sample for examination. One of two ways should be employed: In the first all the milk is drawn or expressed from the breasts, and this is sent in bulk or in mixed sample to the chemist. The second method, which is much more simple, consists in obtaining one ounce of milk before nursing and one ounce after. These may be analyzed separately or mixed together. If a separate analyses are made they must be averaged, as the percentage of fat is much lower at the beginning than at the end of nursing, the difference occasionally being as much as 10 per cent.

It is well known that the time of day at which milk is taken has some influence on the composition of the milk. The chemical analysis must be made by accurate method, because clinical laboratory tests cannot be depended upon, as they are inaccurate.

## THE NEWBORN.

**The Administration of an Obstetric Nursery.** Morgenthaler<sup>107</sup> calls attention to various methods for ligating the umbilical cord. Different methods, however, seem to give practically the same result, namely, that bleeding and infection rarely occur. Dickinson's method of total removal of the cord, or Pomeroy's of tying the cord at the skin margin, leaving very little stump, gave the best results. It is considered a positive disadvantage to have a long stump of umbilical cord complicating the puerperal period. A simple dressing of sterile gauze seems to be best without antiseptic or powders. This dressing should be kept in place by strapping a piece of adhesive plaster three inches wide and four or

<sup>105</sup> Nord. med. Arkiv, October 18, 1919.

<sup>106</sup> Journal of the American Medical Association, 1919, No. 73, p. 662.

<sup>107</sup> American Journal of Obstetrics, August, 1919.

five inches long over the gauze which protects the stump of gauze. This dressing is left on for eight days before removal.

While preparations of silver in the eyes will prevent gonorrheal ophthalmia, the use of too strong solution may bring about irritation, while daily irrigations of the eye with boric acid solution are unnecessary and often irritate healthy eyes. Argyrol is less irritating, but it should be fresh, not stronger than 20 per cent., and used but once.

The practice in hospitals of allowing the child to lie covered only by a blanket for some time after birth before it is washed and dressed is objectionable. The child may kick off the blanket and be exposed to cold. A better method consists in putting the child in a cotton flannel bag with a hood attached and then wrapping it in a blanket. When it is suspected that the child has inspired mucus the head of the crib should be lowered after delivery from six inches to a foot and so kept for twelve to twenty-four hours. It is often surprising how much mucus and amniotic liquid is expelled in these cases. Most maternity hospitals have nurseries entirely too small. Various estimates as to the cubic feet of air required for each infant have been made. They vary from 200 to 600. In one of the largest nurseries each child has but 156 cubic feet of air space, which is far too little. So as regards the temperature of the nursery there is a difference of  $15^{\circ}$  between the temperatures of nurseries and various maternities;  $75^{\circ}$  are considered a good practical temperature for the nursery. Ventilators for these rooms should be at the top of the room. Fresh air should be allowed to enter without occasioning a draft. Among the most ingenious devices is that whereby the lower window sash is raised about nine inches and the opening boarded; the center of this board fits a tin ventilator which runs over the sill and down behind a radiator, where there is an opening. Thus in winter the fresh air admitted is warm. The average nursery, however, is poorly ventilated. In most maternities the number of nurses on duty in the nursery is too small. In 1 ten minutes was given as the average for bathing, dressing and caring for each child. This is certainly much too short a time in which to wash and weigh a baby, take its temperature, irrigate the eyes, swab out the nose and mouth, make its bed and make the record on the chart. With the average of 35 infants in one maternity there are but two day nurses and one night nurse. In the general wards of this hospital 24 adult patients are cared for by six nurses and one head nurse. While it is right that patients go to hospital for confinement, the infant should receive proper attention at the hospital.

The habit of bathing a baby every day during the first month of life is questionable. Oiling every day, with a bath every third day, is much better. Gauze is commonly employed, with castile or some other bland soap. The best method in use is the employment of sterile absorbent cotton balls instead of wash cloths, and these are discarded after using. It is exceedingly rare to have wash basins used for the bath sterilized between each bath. In some maternities they are soaked in 1 per cent. lysol between the baths. Some nurses take the precaution to wash the hands in lysol solution between baths and after changing the diaper, and this custom is to be commended. The use of bathing slabs with

sprays or gentle stream of hot water is to be commended, provided the water supply is reliable and abundant. The writer would discard safety-pins or buttons, substituting pieces of tape stitched to the child's clothing. Shirts for infants should have at least some wool in them, and the infant's clothes should be sterilized by steam and reliance not be placed upon the ordinary laundry. A three hours schedule for feeding is almost universal, but some infants do not receive sufficient nourishment, especially during the night. As regards cribs, a rack fitted with wheels, containing cribs which cannot necessarily be lifted out, seems to be the best device. When it is time for nursing, the rack with its cribs is wheeled into the ward and the baby given to the mother. Every care should be taken to keep infants isolated from immediate contact with each other, and individual cribs should be the rule. In most maternities little attention is given to premature infants, with a corresponding high mortality rate.

One of the most important and often neglected matters connected with the maternity nursery is the method of identification. There is in the minds of the public a considerable dread lest babies in a hospital lose their identity. Various methods are in use, such as wristlets made of adhesive plaster and tape, and tape and adhesive with an indelible linen tag attached. These are tied, sewed or stuck upon the wrist. They contain the baby's name. In some maternities indelible ink is used, but not in all. Sometimes the adhesive plaster is stuck on the chest or body of the child. These methods are all faulty because the adhesive plaster may easily become detached. Other more elaborate methods are liable to the same objection. The most scientific and legally sound method of identification is by the finger-print system. This is complicated and require too much experience and time to be of practical value. Infants can be marked distinctly by using a good dye dissolved in 50 per cent. silver nitrate solution. The dye holds the name on the body until the silver oxidizes, and when that happens on the second or third day the name will remain for over two weeks. The only objection to this method may arise from the parents who might not permit the child to be marked or branded. Infants are sometimes identified by a necklace of beads, the letters of the name appearing on successive beads. These are strung on a strong varnished fish line, plain beads being used to fill up the necklace. It is placed around the neck, double knotted and the ends sealed with a small lead shot such as were formerly used to secure the ends of sutures. The infants are comfortable with these necklaces and the mothers are greatly satisfied. The necklace is put on immediately after delivery and left on until the child is given to the mother ready to go home. This method has been exceedingly satisfactory.

**The Immediate Care of the Newborn.** Arnold<sup>108</sup> cleans all birth fluids from the face of the child so soon as the head is born and before the eyes are open. A solution of argyrol, 20 to 25 per cent., is dropped into the eye as soon as possible, and daily for a few days, and if any indication arises, still longer. The upper respiratory passages are cleansed by grasping



the feet of the child with the left hand as they escape from the birth canal, inserting one or two fingers between the knees to prevent slipping, and holding the child head downward, an aspirator is inserted and suction made to clear the upper air passages before the child takes its first breath. This he believes to be the least injurious and most available method of removing birth fluids from the nose, mouth and throat.

The umbilical region is painted with 3 per cent. tincture of iodine. The cord is clamped as close as possible to the skin margin with a small hemostat as soon as possible, and is left in place until the child is bathed, a half-hour or more; the nurse then removes the clamp, again applies iodine to the umbilicus, followed by a small gauze dressing; once daily for the next two or three days iodine is applied.

The child receives its daily bath without reference to the umbilicus, the small stump atrophies in a few days, the umbilical ring retracts and closes quickly and this greatly lessens all danger of infection, hernia and inflammation. The ligator is placed in the curve between the skin and Horton's jelly, which practically amounts to ligating the vessels and not to the usual procedure of tying the cord. The same care is given in the after-treatment, which is usually employed after any ligator is used. The results seem particularly good; there have been no hemorrhage or hernias, and fewer cases of jaundice and other symptoms of inflammation than by any other method of caring for the cord.

**Infant Feeding.** Infants have been fed with little variation and with little regard to the individual peculiarities of the child. In the *British Medical Journal*, April 5, 1919, Jackson gives the results of his experience in varying the periods of infant-feeding in his work in the prenatal care and baby clinics. He has been medical officer to the Infant Welfare Association, having 1000 infants under his care. About fourteen years ago he became convinced that the day interval of feeding should be three hours without night-feeding, and he has followed this plan with very great success. At the time of his writing six pairs of twins were attending the infant clinic, some of whom weighed at birth four and a half pounds or six pounds. These have all made good progress, with three-hour intervals of feeding. In the case of triplets, at the age of ten months, none of the three weighed less than twenty pounds, and they have grown steadily. He described the case of a perfectly healthy infant weighing eighteen pounds nine ounces at eight months who had been fed three times in twenty-four hours since the age of three months.

He has closely watched the children under his care to detect symptoms of starvation from a three-hour interval. The worst cases of malnutrition which he has seen were those in which the children were fed every two hours and one every hour and a half. Many infants are brought to the clinic suffering from dyspepsia and loss of weight who are fed every two hours, and these begin to gain in weight the first week after the intervals between feeding are lengthened. He is convinced, from his experience, that infants do best when kept eight hours at night without food, although boiled water in small quantities may be given freely if the child is restless or fretful. The habit of sleeping for eight consecutive hours at night is invaluable for mother and infant, and produces an improvement in the quality of the milk.

It is true that no hard and fast rule as to quantity is practical. In 100 unselected cases the record shows an average gain in weight when the interval of feeding was lessened to three hours of one pound or one pound and six ounces in a month.

**Infant Morbidity during the War.** Moussous<sup>109</sup> has found that chilling of the newborn infant damages its red blood cells and that the stasis and dissolution of the blood may become manifest in jaundice. The lack of adequate heating in homes, especially among the working class during the day, has had much to do with the high mortality among young infants. All through the war a good supply of milk was available for infants at Paris, for the authorities, anticipating a siege, had provided within the city a large herd of dairy cows. At Bordeaux the death-rate among newborn infants became so high that for some time the authorities admitted the mothers to the hospitals when their infants had to be taken there.

**Physiological Loss of Weight and Transient Fever in the Newborn.** Heimann<sup>110</sup> draws attention to the prevalent statement that the newborn always loses in weight for the first eight or ten days after birth. He criticizes the accuracy of this statement and reviews the literature upon the subject in the Clinic at Breslau. The writer has studied the material during the last eight years; this comprises 6384 children and the mothers and children who did well, leaving the hospital on the seventh to eighth day; 1581 nursing infants were studied whose mothers remained in the hospital longer than ten days. Evidently, very ill mothers and children were not included. Most of the mothers, however, remained longer in the hospital because they had been delivered by some form of operation, or because they were able to do so. Where mothers developed fever, the cases were not included. These children were weighed as soon as possible after birth and were given five feedings in each twenty-four hours. In 97.5 per cent. the children were breast-fed, while 28 of the children received asses' milk. The average weight of the children was 3262 gm., indicating a well-nourished condition. Most of the mothers had worked in factories or in domestic service, and had been disturbed by the war conditions. As regard the time during which the initial loss of weight occurred, writers vary from two to three or eleven days, and this variation was observed in the cases considered.

It seems to make no difference whether the child at birth weighs much or little. It is, however, natural that children weighing most at birth lose most. The average loss was 2.4 gm. for each 100 gm. of body weight. Regarding the question whether the children of primiparæ lost more than those of multiparæ, no definite answer was given. The majority of children lost the same amount during a period of from eight to ten days. The greater majority had made up the loss and had come back to their birth-rate in from fifteen to twenty-one days. Among the children who made up the weight in the first ten days, 5.95 per cent. were those of primiparæ and 4.82 per cent. those of multiparæ. The writer alludes to the frequency of icterus in various degree among these children.

<sup>109</sup> Journal de méd. de Bordeaux, February 28, 1919.

<sup>110</sup> Monatschr. f. Gynäkologie, January, 1920.

Various causes are given for this loss of weight, among which are injuries received at birth, which is proved by the fact that children delivered by Cesarean section lose less and stop losing more rapidly than those born through the vagina. Where absolutely physiological conditions pertained, 5.5 per cent. regained the initial weight in ten days.

The writer alludes to so-called transient fever, or fever without apparent cause in the newborn. Various writers upon the subject stated that children are little disturbed by this and that it usually accompanies the initial loss of weight. The writer describes a case which he studied as divided into three groups: those in ideal condition, those in poor condition and those fed artificially. A temperature above  $37^{\circ}$  C. was considered as fever. The children did not seem in the least disturbed by this, although occasionally one was a little more restless than usual, but continued to take nourishment well. Enlargement of the spleen was rarely observed in these cases. The writer studied 8441 nursing infants to determine whether the cause of the fever arose in the lower bowel or umbilicus. With children put to the breast, twenty-four hours after birth the percentage having fever was 18 per cent., while if put to the breast twelve hours after birth the percentage was 3.1 per cent. There seemed to be a considerable difference not only in the height of temperature, but also the frequency of its development; evidently hunger plays a considerable part. The greater the loss the more frequent the rise in temperature. When the loss was but 200 gm., fever was comparatively rare, but with a loss increased from 300 to 500 gm. it was much more frequent. When loss was excessive, as 550 gm., it was interesting to note that the fever was comparatively rare; this would warrant the inference that hunger alone is not the cause of fever, but that there must be absorption of bacteria from the bowel or predisposition on the part of the child. The fever usually begins a day before the loss in weight.

The writer's studies lead him to believe that it is not loss of weight, absorption of pyogenic substances, complicated by the flora of the milk and the meconium—not one of these, but a number of factors together, produces this phenomenon. He believes that these factors are perfectly harmless, and that, under ordinary circumstances, the condition requires no special treatment.

**Measurements of the Newborn.** Taylor<sup>111</sup> measured 250 full-term, naturally born children, 125 of each sex. All had been born at term and were apparently normal. The measurements were taken between the second and tenth day, so that injuries at birth might have disappeared and changes which occur after the child is born had not yet developed.

Measurements were done from the vertex to the sole of the foot, the height of the head and neck, the distance between the plane of the vertex and that of the umbilicus; the length of the body from the vertex to the tuberosity of the ischia; the length of the arm from the acromion to the tip of the second finger and length of the head, the leg, the foot; distance between the thighs, hips and shoulders; the circumference of the chest and head; the distance from one finger-tip to the opposite; the length of the trunk; the height of the head.

<sup>111</sup> American Journal of Diseases of Children, 1919, No. 17, p. 353.



The apparatus consisted of a rectangular paste-board, the side boards making an angle of 90 degrees, this was covered with paper and the distance marked in ink, a sheet of celluloid tacked over the paper and on this the child was placed, its head firmly held against one of the side boards, the left shoulder touching the other. Considerable individual variation was found, the spread of the arms being as long or longer than the length of the body in 65 per cent. of the children. In the majority the circumference of the head was greater than that of the chest. The length of the trunk was greater than the length of the arm in a great majority, and greater also than the length of the leg. In male children the middle of the body was at or above the navel in the majority; this was also true of the majority of female children.

**Fetal Death.** McQuarrie<sup>112</sup> studied 2717 infants, among whom there were 97 fetal deaths. After making all due allowance for injuries at birth the percentage of fetal deaths was found to be 3.6 per cent. There were also 22 cases in which the fetus died before viability, and this increased the percentage to 4.4. There were 2 cases of twins; 117 mothers lost their children. Among these deaths, injuries at birth was responsible in 37.1 per cent.; in 17.5 per cent. the cause could not be found; in 15.5 per cent. syphilis was responsible; in 9.2 per cent. toxemia; in 8.2 per cent. abnormality of the fetus; in 5.3 per cent. the child was premature; 2 per cent. died because the mother had placenta previa, and various other causes in 5.2 per cent., among them, birth trauma, prolapsus of the cord and breech presentation. Delivery by forceps through a contracted pelvis of moderate grade, and also the administration of pituitrin during labor, had to do with the death of the child. In one case the woman had simple flat pelvis, and so-called twilight sleep was attempted; delay in delivery caused the death of this child. Among the children dying of toxemia there was one case in which the mother developed eclampsia. There was a well-organized prenatal service in this clinic which had greatly reduced the number of cases of severe toxemia among the mothers. One mother was a confirmed drunkard and was drunk when delivery was made; the child was born macerated.

It was interesting to observe that in 2 cases hemorrhage from placenta previa occurred before labor; one of these was treated by bag, and when the bag was removed the cord was found to have prolapsed and pulseless, and the child was stillborn at full term. The other case, treated by dilatation of the cervix, Voorhees bag, dilatation and version, a full-term stillborn child was obtained.

Among the various causes for fetal deaths was one in which the normally situated placenta separated prematurely, 2 in which membranes ruptured prematurely, 1 of abdominal pregnancy and 1 in which there was hemorrhage into the cord. When the membranes ruptured prematurely the child seemed to perish from infection ascending through the cord. The fetus in the case of abdominal pregnancy might have been saved, as the child had grown to be large, ten pounds, but the mother had other children dependent upon her and declined to take the

<sup>112</sup> Journal of the American Medical Association, November 22, 1919.

risk of operation for a living child; accordingly the operator waited until two weeks after the death of the child, when the mother had sharp rises in temperature and pulse, indicating necessity for operation; a dead fetus and partly involuted placenta were safely removed. -

One child died at seven months from hemorrhage from the umbilical cord two hours after birth. This child had been delivered from a woman with placenta previa. So far as primiparae and multiparae are concerned fetal deaths occur among these cases in nearly equal proportion. There were normal pelvises in 98 cases, generally contracted in 8, simple flat in 4, rachitic flat in 3 and rachitic transverse contracted in 1; 1 of rachitic generally contracted, 1 assimilation pelvis and 1 funnel pelvis. So far as presentation of the fetus was concerned it was normal in one-third and breech in one-quarter. It is interesting to note the high percentage of breech presentations, and in most of these labor was premature. The breech presentation complicated labor in these cases, and often causes difficulty in extracting the child; most of the macerated fetuses in this series were in breech presentation.

**The Artificial Feeding of Athreptic Infants.** Marriott<sup>113</sup> has fed successfully infants that digested with great difficulty, by combining Bulgarian tablet buttermilk with carbohydrate in the form of dilute corn syrup. This combination is in no way intended as a substitute for mothers' milk, but is useful in cases in which the child cannot nurse for some reason or the supply of breast-milk absolutely fails, and the effort to feed other preparations causes diarrhea. In these cases it is well to begin with a mixture of equal parts of whole lactic acid milk and buttermilk, or, if the child has diarrhea, buttermilk alone, gradually whole lactic acid milk is given and then 3 per cent. of sugar, in the form of a solution of corn syrup, is added and increased as the child will tolerate it. The glucose is increased until the child begins to gain in weight in accordance with its tolerance.

**Intolerance of Breast Milk.** Weill<sup>114</sup> stated that he had recently seen 3 breast-fed infants, and 11 who were partly nursed, who had disturbance of digestion which could not be ascribed to infection or intoxication, and in these cases no lesion could be found. He believed that this was a condition of anaphylaxis and attempted to produce anti-anaphylaxis by injecting milk subcutaneously. To produce this vaccination, human milk must be used against breast milk and cows' milk against cows' milk. Infants who were so treated six months prior to the time of writing have had no relapse and developed normally. Some of these children who could not bear milk had vomiting; some, a greater number, had a discharge from the bowel which were green and caused chafing. Others had obstinate constipation. Usually these children were highly nervous, often screaming after feeding until it vomited. These children could not sleep easily, were restless, but had no fever, and the general condition remained good. Eczema or impetigo was sometimes present, but usually no skin lesions which are characteristic of anaphylaxis. If the child's food is changed to another sort of milk or some other food, or if drugs

<sup>113</sup> Journal of the American Medical Association, October 18, 1919.

<sup>114</sup> Presse méd., Paris, October 18, 1919.

are used, it may improve for a time, but very soon becomes worse. If milk is entirely dropped the disturbance ceases, but the child is nourished with difficulty.

Some of these infants cannot bear the mothers' breast milk from birth; in these the condition develops a month or two after birth. In one case the mother had a phlegmon a month after her confinement, and the child, previously healthy, could not assimilate her milk.

Injections of milk are given in the child's flank, and, if cows' milk is used for a few hours there is a rise in temperature; but if breast milk be employed this is absent. Two cases were given repeated injections, which caused slight shock for ten to fifteen minutes, with cold extremities. Breast milk can be injected heated to 110°, boiled or raw. Cows' milk should be heated to 110° C. for ten minutes, or boiled or heated. The first dose is 5 to 10 c.c. If the child does not improve at once a second or third injection is given by the Besredka method, first 0.5 c.c., then one hour later, 2 c.c., and after three hours 5 to 10 c.c. One infant of twelve months had severe spasm of the larynx, which was apparently stopped by injecting less than 1 c.c. of the milk twice.

The writer is now applying this method in cases of congenital vomiting—producing anti-anaphylaxis by injecting mothers' milk into both the mother and child.

**Acidosis in the Newborn.** Seham<sup>115</sup> studied 50 infants from one hour to thirty-two weeks old, making in all 150 examinations, to ascertain the existence of acidosis. So far as one is able to cause infants to exercise, he observed the effect of exercises upon these children. It was comparatively easy to study the effect produced by various kinds of food. In making a diagnosis of acidosis he observed that the alveolar carbon dioxide tension is a practical index. To obtain the best result in the greatest number of cases he employed intervals of thirty seconds for breathing in 50 c.c. of air into a bag or apparatus. In collecting air for newborn babies he uses the pulmotor mask, with the Blesch-Higgins method. The lower carbon dioxide tension, which some think indicates the acidosis state, he could not identify. Under these conditions exercises, food or starvation had no effect which he could identify in the alveolar carbon dioxide tension. The healthy newborn child has almost invariably an acid urine, and this requires on an average of 1.7 gm. of sodium bicarbonate to alter the reaction of the urine from acid to alkaline. The usual method of accomplishing this is to give 0.06 gm. of sodium bicarbonate by mouth every two hours. The urine of the normal newborn child contains practically no acetone.

**Habitual Vomiting in Infants.** Marfan<sup>116</sup> has found that in syphilitic infants who have habitual vomiting, lactated mercury can be given by the mouth better than any other preparation. It is extremely important that the child be fed in spite of the vomiting, for the lack of food will greatly increase it. It is far more important to feed the child than to stop the vomiting. Of all foods breast milk is best, but if this cannot be obtained asses' milk is next in value; if this is impossible, skimmed cows'

<sup>115</sup> American Journal of Diseases of Children, July, 1919.

<sup>116</sup> Nourrisson, Paris, July, 1919, No. 7.



milk must be used. As a rule it is the fat in cows' milk which causes the greater disturbance. Such infants can usually digest sugar and 10 per cent. should be added to skimmed milk. Kefir and buttermilk are tried but are usually too sour; they should be diluted with one-third water and one-third lime water. At three months thin gruel with or without maltose may be tried. If the child is over six months the gruel may be thickened or very thin bean soup may be employed, increasing the proportion of milk. Material which is semifluid is not so readily digested as that which is entirely fluid.

In serious conditions very small feedings at short intervals should be tried. In one case he used one or two teaspoonsful of ice water every half hour, and after a half day of this treatment the stomach had obtained the needed rest. Breast milk may then be given with a spoon and nursing or sucking should be avoided, as it often arouses reflex vomiting. The nourishment given should be cold, a teaspoonful every fifteen minutes. If the infant begins to retain this, two or three teaspoonfuls are given every half hour for six hours, and finally four or five, and the child allowed to sleep for six or seven hours. Gradually, the quantity is increased with longer intervals, and as soon as possible the child is again put to the breast. Although the child may still vomit occasionally, it retains enough food to gain in weight.

If the vomiting returns the child should be fed with a medicine dropper, giving a few drops in the child's mouth every three or four minutes. At five months rice gruel may be used; in some cases duodenal feeding is employed and, in some, breast milk is given by the rectum. It must be remembered that there is an element of nervous excitability in these cases, and the bottle should be held almost horizontally to prevent the child from swallowing air. When the child has been fed the trunk of the body should be held horizontal for a short time to aid in the expulsion of the air which may have been swallowed. Hot enemas are often useful. In combating vomiting, bismuth may be given before feeding or may be added to the child's food. Hot compresses may be applied to the stomach and abdomen and renewed hourly; for five or six days, twice daily, a tub bath for ten minutes may be employed. Gentle massage to the abdomen twice a day for ten minutes with camphorated oil or camomile is useful when sedatives are not. Opium should not be given, but tincture of belladonna should take its place, to which bromide may be added, and, if there be hyperacidity, sodium bicarbonate. While lavage of the stomach is useful in some cases, in others it has a tendency to bring on convulsions.

**Drug Habit in the Newborn.** Laase<sup>117</sup> had under observation a woman, aged twenty-seven years, in good general condition, but who had taken opium for over two years. Her pregnancy was uncomplicated and apparently normal so long as she had opium enough to keep her from disturbance. Pregnancy proceeded smoothly, when labor came on she was practically without opium, and at the end of labor she was in a highly excited condition, very restless and suffering great distress. Just

<sup>117</sup> American Medicine, 1919, No. 14, p. 283.

before the birth of the child she attempted suicide to end the suffering of labor and the deprivation from opium. Labor pains were strong and there was no difficulty about delivery.

The child was well nourished, apparently healthy, but restless from birth. Its symptoms resembled those of the mother, restlessness increased and it began to yawn and sneeze, while its expression was pinched and its color poor. It drew up its legs and cried as if in pain; the pupils were widely dilated and the child threatened with collapse, with general convulsions. A drop of paregoric in water was given and more administered; these symptoms disappeared. If opium was withheld longer than eight hours the child's distress returned; when lactation was established the child got its opium through the mother's milk. Just before nursing it was excitable, restless, somewhat as if deprived of opium, and as soon as nursing was complete this subsided. If the mother's supply of opium was lessened the child immediately showed the effects. So far as could be made out the condition was purely a physical one.

**Luxation of a Lumbar Vertebra at Birth.** Holman<sup>118</sup> reports the case of an infant born of a mother very small in stature. She had had 4 pregnancies with only 1 living child. The second pregnancy terminated at seven months, when the membranes ruptured without pains. Under chloroform, version and breech extraction were performed; there was laceration of the mother and the skin was torn from both legs of a male infant and produced marked version of both feet. The child weighed about two and a half pounds and it was thought impossible that he could live. He was kept alive for two weeks on whisky and crackers, and then nursed successfully. When one month old the mother noticed a sinking-in in his back, which grew worse. His legs were apparently paralyzed below the hip.

Upon making a very careful examination, including an *x*-ray picture, scoliosis of medium degree was seen. There was a distinct break in the normal alignment of the bodies of the vertebra occurring between the first and second lumbar vertebra, exactly opposite the apex of the lordosis. When the history of the difficult birth was considered, and the fact that deformity of the back developed so early and persisted with bilateral paralysis and definite *x*-ray picture, there was no difficulty in making a diagnosis of dislocation of the first lumbar and second lumbar vertebra.

**Scleroderma in Infancy.** Mayer<sup>119</sup> finds, on reviewing the literature, that scleroderma is so rare in infancy that in 1918 but 7 cases had been recorded. The writer brings the total up to 10 with his case. The patient was a male infant, eighteen days old, admitted to the hospital with an infiltrated area on the left cheek, from which the skin could not be separated. The area was red and slightly raised, with a sharp line between the disease and the healthy skin, and was very tender. There was no fever nor general disturbance, which seemed to rule out a septic condition. The redness of the skin, and the fact that skin was included

<sup>118</sup> Journal of the American Medical Association, November 1, 1919.

<sup>119</sup> Deutsch. med. Wchnschr., July 31, 1919.

in the swelling, excluded lipoma. This infiltration gradually spread to other parts of the body, although the general condition remained good. A Wassermann and von Pirquet reaction were negative, and no micro-organisms could be found in the blood. In six weeks the infiltration had extended, so that the trunk and limbs were partially covered, and on the left foot the middle toe seemed to be gangrenous. Then, without apparent reason, the infiltration disappeared rapidly and in three months the child had entirely recovered.

**Congenital Stenosis of the Pylorus.** Ramsay<sup>120</sup> read a paper before the Medical Society of London in which he stated that he regarded congenital stenosis of the pylorus as a true hypertrophy and operation gave the best chance for recovery. Failure arises from two causes, on one the treatment is not instituted until the child is greatly emaciated, so that after operation it cannot assimilate food and at times had severe or even fatal diarrhea. The other cause of failure was the liability of the infant to death from shock. At operation, the time taken must be as short as possible, the abdominal viscera exposed and handled as little as possible and all manipulations carried out with great gentleness.

The writer describes three methods of operation, one of pyloroplasty and its modifications, dilatation or divulsion of the hypertrophied muscle and simple division of the constricting band, in which there was the advantage that manipulations were limited to the pylorus and adjacent parts of the stomach.

In discussing the operation of pyloroplasty and Loreta's operation, usually described as dilatation of the stricture, but which actually includes rupture of the constricting band, the writer expressed the opinion that this was preferable to resection or gastro-enterostomy, there was less disturbance of the parts, less suturing and no hemorrhage. The whole making a short operation without much shock.

Rammstedt's operation had many advantages. The hypertrophied muscle was incised from the peritoneal surface as far as the submucous layer; the mucous membrane was left intact and the stomach was not opened. So far as the pylorus was concerned the result was the same as when the constricting band was ruptured by dilators and the success of the operation depended upon the tendency of the divided muscle to widen the constriction by its contraction and by the redundancy of the mucous membrane.

In his own operations he used chloroform, followed by ether. The operation required about six or seven minutes, and as soon as the child was returned to his bed he was given food. The final result depended upon the degree of wasting present, and so the earlier the operation was done the more hope there was of success in the subsequent treatment by suitable feeding. Of his 3 cases, 2 died, but in neither instances from postoperative shock, which is usually so frequent and fatal. All three recovered from the effects of the operation and gave evidence that the pylorus was patent. In one case death occurred after six days from failure of assimilation; in the other case death occurred four and a half weeks after operation from ileocolitis.

<sup>120</sup> British Medical Journal, March 8, 1919.



**Tetanus in the Newborn.** Eguia<sup>121</sup> in the case of an infant that had developed tetanus when ten days old gave antiserum freely. He injected 10 c.c. of the antiserum, giving 0.10 gm. chloral by mouth, and tepid baths, keeping the head cool, every two hours. The child was nourished by its mother's milk, of which a teaspoonful was given every three hours. The antiserum was applied to the stump of the umbilical cord. Orders were given to administer 0.25 gm. of chloral in enema every three hours in case of difficulty in swallowing. During one very severe paroxysm chloroform and oxygen were administered. This child recovered after a long and severe siege with the disease. In eighteen days this infant was given 140 c.c. of the antiserum, and was able to nurse by the mouth by the nineteenth day.

**Cerebral Hemorrhage in the Newborn.** Warwick,<sup>122</sup> in 36 autopsies on newborn infants, found hemorrhage in some part of the brain in 18, or 50 per cent. Of the 18 infants, 11 were a little below the average weight and 7 were above the average weight. Eleven mothers were primiparæ, 1 over thirty, 1 twenty-nine, the remaining 9 were twenty-four years or less. This repeats the observation which has been often made that first labors are more dangerous to the child in the production of cerebral hemorrhage.

But one of these children was delivered by forceps, and this was in the case of a mother dying of pneumonia, at six months pregnancy. Prolonged labor was present in only 2 cases, both of which were twin labors, the first normal and the second with cerebral hemorrhage. Of the 18 cases, only 2 were stillborn, 4 had asphyxia and 2 showed respiratory symptoms from birth.

It was especially important to observe that 44 per cent., or 8, of these infants showed hemorrhage of other organs of the body than the brain, of these 5 vomited blood before death, showing that Buhl's disease or hemoglobinuria of the newborn was present. One-quarter of these infants were premature, but none showed signs of syphilis. The hemorrhage was over the cerebrum in 72 per cent. of the cases; at the point where the bloodvessels branch from the longitudinal sinus, these vessels are not protected by the dura mater which forms later in life. They are easily injured during labor when there is pressure upon the head.

The writer divides cerebral hemorrhage in the newborn into three classes: in the first the accident happens from traumatic injury to bloodvessels during the stage of molding of the head. Labor may be normal.

In the second class he places congestion or stasis of the blood in the cerebrum, resulting in rupture of the veins, and this occurring in protracted or complicated confinements. In the third division are cases in which the child suffers from intra-uterine disease or in which the mother has toxemia. It is evident that in most cases no one cause is entirely responsible, but that a number of causes may contribute to produce the final result.

**Two Cases of Lesions of the Brain Occasioned by Traumatism in Newborn Infants.** Bebeke and Zausch<sup>123</sup> report their first case of extensive

<sup>121</sup> Prensa medica, Argentina, January 30, 1919.

<sup>122</sup> American Journal of the Medical Sciences, July, 1919.

<sup>123</sup> Zentralbl. f. Gynäkologie, 1920, No. 2.

bleeding into a ventricle of the brain resembling greatly a case reported by Seitz, which was followed by recovery. In the case of the writers the gyri of the hemispheres were compressed, both lateral ventricles enlarged and completely filled with blood. From the lateral ventricle the bleeding extended to the third and fourth ventricle and then to the medulla as well; proceeding upward the blood reached to the base of the cerebellum while at the medulla the bleeding was subdural. Examination of the remaining portions of the child's body revealed nothing unusual. The right lung was not fully distended. Seitz had argued that this condition arose after a rapid normal labor, from asphyxia, produced by the aspiration of mucus into the air passages.

In the first case reported by the writers the left lateral ventricle was filled with a firm blood-clot; this extended through the foramen of Monroe into the third ventricle and extended it completely, and then had made its way through the aqueduct of Sylvius and then through the foramen of Mengendi to the upper surfaces of the base of the brain.

Nowhere could a lesion of the cerebral tissue be demonstrated; the other portions of the child's body were normal. The child had been still-born and the widespread bleeding had been caused by the fact that a large vessel had been torn. It was impossible to demonstrate clearly the point of hemorrhage.

In the second case the bones of the cranium were normal and there was no blood beneath the dura. When the brain was removed a thick stream of partially clotted blood came from the left base of the brain. The cerebral tissue showed softening in some portions where it was pale white and without jaundice. The ventricle was greatly dilated, with some thickening of the tissue. The ventricles were filled with clotted blood, and this had extended toward the base of the brain. The tissue surrounding the blood showed no hemorrhage in their infiltration. No adequate cause could be found for the dilatation of the ventricle. There was no laceration of the tentorium. The heart of the infant was normal. Some mucus was in the larynx and a beginning bronchopneumonia in the right upper portions of the lungs; other portions were collapsed. Microscopic examination showed the brain substance infiltrated with nuclei. The history of the labor was partial placenta previa, with version followed by spontaneous birth of the umbilicus, when extraction was then performed. The child died on the twelfth day after birth. It is difficult in these cases to find the exact cause for the hemorrhage, which had been slow and progressive during the twelve days.

A left-sided paralysis had developed shortly before the child's death. It was thought that rupture of the cerebral veins had been the cause of this condition.

**Diphtheria in the Newborn.** Hollatz<sup>124</sup> reviews the recent literature, describing several endemics of diphtheria in several European clinics. The observations quoted in the paper were made in the Clinic at Königsberg in March, 1918. A newborn child was admitted with impaired respiration and profuse bloody discharge from the nose, in which

<sup>124</sup> Zentralbl. f. Gynäkologie, 1920, No. 8.

diphtheria bacilli were found. As no other children in the hospital showed symptoms, prophylactic inoculation was not performed. At the end of April a syphilitic child showed the same symptoms and prophylactic inoculation was at once performed. Four more cases developed. Following this all nursing children were regularly given inoculation.

Bacteriological examination in these cases was positive, not only in the children apparently ill but in those who showed no signs of the disease. One hundred and thirty-four children were inoculated once, and among these 78.9 per cent. were negative and 21.1 per cent. positive. In the second group 62 children were inoculated twice, of whom 14.5 per cent. were positive on both occasions; 29 per cent. positive once and negative once; 54.8 per cent. negative twice; 1.7 per cent. doubtful once and negative once. In the third group were 21 children inoculated several times. Of these, 13 per cent. were positive; 26.1 per cent. positive more than once; 39.2 per cent. positive once only; 21.7 per cent. always negative. There were 76 children who were positive in their reactions at least once, making 35 per cent. As a complication, otitis media was observed in 2 cases. In about six months after the beginning of the endemic it seemed to cease and the regular inoculations were abandoned.

At first only nursing children were inoculated, having a definite nasal catarrh with bloody discharge; later children were inoculated when the discharge was serous or purulent but not bloody. The positive reaction was obtained in these cases; several cases developed further, and seven or eight months after the beginning of the endemic a pregnant woman was brought into the maternity department with pyelitis. There was some redness in the fauces; inoculation was made with a positive result. All of the patients and attendants in the hospital were then inoculated. Of 16 pregnant women, 10 gave a positive result; of 5 nurses, 2 were positive and 1 resident physician. Of 18 nursing children, 6 were positive; of 7 pupil nurses, 2 were positive, while the other members of the staff gave negative reactions. Inoculation was immediately practised at regular intervals and 2 of the pregnant women gave positive reaction for the second time; they were removed to a hospital for contagious diseases. There were 159 of these cases, of whom 21 were positive once, and among 33 nursing children 6 were positive and 61 patients were negative. Among nurses and pupil nurses there were 32 negative and 4 positive. Among physicians 5 negative and 1 positive. Among pregnant waiting patients, 7 negative, 10 positive; of these 2 were positive twice. When the last inoculation test was made it gave uniformly negative result. The endemic lasted then from March until September.

The question was raised as to the original source of the infection. This may have arisen from some person who was a carrier, or some visitor having diphtheria germs may have brought it into the hospital. It is possible that a nursing child, brought in from outside, may have had an infection, and, again, the original source may have been bacteria from the vulva or vagina of one of the puerperal women. Efforts were made to completely check the endemic, but sporadic cases arose until it was found that one of the midwives was a carrier of bacteria. When the second epidemic was considered it was found that a patient with



swollen legs and threatened eclampsia was brought into the clinic attended by a midwife. The patient was confined and shortly afterward her husband visited the hospital and remained for ten minutes at the bedside of his wife. The man stated that he must see his wife, because they had three of their children ill at home with diphtheria. It was quite possible that his visit was the cause of the beginning of one of the epidemics.

Various writers upon the subject described varying conditions which give rise to such complications. Menge and Koenig found diphtheria bacilli in the vagina in apparently healthy women. In their clinic the vaginal secretion of pregnant women was examined for diphtheria bacilli, and the result was positive in 7 cases. Another instance is recorded in which a newborn child was taken ill on the sixth day after birth and died on the fourteenth day with well-marked diphtheritic infection of the conjunctiva, nose, pharynx and esophagus. Diphtheria bacilli were found in the urethral secretion of the mother. She stated that for three months before her labor she had had a greenish purulent discharge.

In searching for the cause of such infection one must not overlook the frequency of diphtheria of the conjunctiva. In the majority of cases diphtheria in the newborn runs a comparatively mild course. It is, however, always an uncertain disease, and hence, every precaution should be taken to avoid the development of such an infection.

**Obstetrical Paralysis.** Boorstein<sup>125</sup> believes that in these cases a good deal can be done by employing orthopedic treatment when the child is young and before contractures have formed. Some of these cases require operation while others do not. When the upper arm is involved, exercises, massage and comfortable support usually give good results if the treatment is begun sufficiently early. If there is delay in treatment then operation may be indicated to prevent and correct deformities produced by contraction. If the lower arm is paralyzed the plexus must usually be repaired by operation, although it is advisable to try other treatment for a short time before operating.

When muscles have been paralyzed the arm should be so put at rest that the supporting muscles cannot contract. This will prevent permanent contraction of the muscles that have been paralyzed. A plaster cast or light wire splint is usually indicated. The arm should be placed at right angles with the trunk and the hand rotated outward while the forearm should be supinated. Exercises and massage are especially important. If there have been injuries to the joint which should be corrected, and when there has been much contraction, it may be necessary to anesthetize the patient and use forcible straightening. If the brachial plexus has been seriously injured in delivery operation is usually indicated.

The writer believes that obstetric paralysis should go to the orthopedic surgeon for treatment, the same principles should govern as in cases of anterior poliomyelitis. While the physician should be on his

<sup>125</sup> Medical Record, 1919, No. 96, p. 790.

guard to detect and prevent the development of deformity it is especially important that excessive use or stretching of weak muscles should be avoided. To prevent the stretching of the deltoid the shoulder should be immediately put at rest; this allows the absorption of blood which has been extravasated and also permits the repair of damage of the nerves. Usually the injuries to the nerves are not important, and if the patient receives treatment promptly a cure results. Conservative treatment should not be prolonged more than two months and operation on the plexus should be performed unless marked improvement has taken place. Massage, support and exercises are the alternative with operation; electrical treatments produce no results. The form of operation done on the brachial plexus is that devised by Taylor.

**The Significant and Frequency of Omphalitis.** Creadick<sup>126</sup> has examined microscopically the umbilical cord in 2200 cases in which the child weighed more than 1800 gm. Among these were 43 cords showing infiltration of the walls of the vessels and connective tissue with leukocytosis. This condition does not indicate syphilis, for it was observed in 40 infants showing no signs of syphilis, while it could not be found in 29 cases in which syphilis was provenly present. It was thought that passage of bacteria from the placenta to the cord accounts for this condition. If one makes section of the cord at varying points, bacteria are often found. This condition is usually observed when membranes have ruptured early and labor has been long. The writer uses this as a plea for examinations in labor through the rectum and not through the vagina.

**Maceration of the Living Child.** Lorenzen<sup>127</sup> reports an interesting case of primiparæ somewhat anemic with healthy heart and lungs, in whom the urine was found to contain a considerable percentage of albumin, but no casts. There was no evidence of syphilis, the pelvis was normal, the birth of the child spontaneous an hour and ten minutes after the rupture of the membranes and the amniotic liquid which was expelled was copiously mixed with meconium. A median episiotomy was made at the moment of labor. The child, 53 c.c. long, weighed 3210 gm. It showed a curious appearance of being entirely macerated. The epidermis was loosened in large masses, especially around the back, arms, hands and soles of the feet, where considerable portions were separated. On the thorax, extremities, face and hairy scalp the loosening of the epidermis was in much smaller portions. The fingers and toes were normally covered with epithelium. There were no definitely formed blebs and the process of maceration had not attacked the mucous membranes. Upon closer examination it was found that the corium had been entirely uncovered, but that this was clothed in a thin layer of naturally developed epithelium through which could be seen the blood-red corium. When the child was bathed, large portions of epidermis were readily removed, the smaller loosened portions were more adherent, but these came away in the next few days. By the seventh day after birth the child's skin was perfectly smooth and free from epithelial masses. The

<sup>126</sup> *Surgery, Gynecology and Obstetrics*, March, 1920.

<sup>127</sup> *Zentralbl. f. Gynäkologie*, January 31, 1920.

epidermis was soft and the customary erythema of the newborn was strongly developed, and there was slight jaundice. The child nursed well.

When an explanation was sought for this condition it is possible that the mixture of biliary salts from the meconium and the amniotic liquid had produced this maceration, but this phenomenon is usually seen in children who have died *in utero* several days before birth. In these cases the epidermis is separated in blebs containing a yellowish or blood-red fluid and varying considerably in size, the epidermis loosens in accordance with the location of these blebs, leaving the corium entirely free. If there has been sufficient time this process of disintegration extends to the bones at the joints, bones of the skull, so that the cranium becomes more or less loosened. In syphilitic children the characteristic pemphigus may proceed to maceration and in some cases the same result is observed in children who are not syphilitic. Zangenmeister has reported 2 newborn infants with well-developed syphilitic pemphigus in which the entire skin had been affected and was macerated; these children lived for a few days after birth.

Pemphigus neonatorum is not a very common disorder; in most cases the syphilitic origin can be proved or must be suspected. Such children, although born living, rarely survive for any length of time. Most writers upon the subject of pemphigus neonatorum believe that it is caused by infection from staphylococci. From the blebs have been isolated staphylococci and streptococci. In the case reported by the writer no definite blebs could be found. Schreiber reported a similar case in which a child, born living, had the entire epidermis separated from the subjacent tissue and loosened in masses, the child had the appearance of complete maceration. In the case reported by the writer the maceration had not proceeded to an extreme degree. In most of these cases heart sounds are rapid and weak, but in the one described they were regular and of fair strength. The writer has several times observed cases in which the amniotic liquid contained abundant meconium, but in which the children appeared uninjured and the heart sounds were good.

The writer believes that biliary salts in the amniotic liquid caused the condition, and the child lived because the entire skin did not become loosened. The rapid growth of epithelium in the affected portions contributed to this favorable result. In this case the Wassermann reaction in the mother was absolutely negative, and the fact that the condition cleared up so rapidly is proof that it was not specific. It is scarcely possible that this was a case of extensive pemphigus, for the characteristic appearance of pemphigus was lacking. If there was an element of this in the case it arose from separation of the external layer of the skin.

**Congenital Syphilis.** DeBuys and Loeber<sup>128</sup> studied the infants in a foundling asylum to determine the existence of congenital syphilis. The Wassermann test and the luetin skin tests were employed and complete physical examinations were made regarding growth, development and symptoms usually caused by congenital syphilis.

<sup>128</sup> Journal of the American Medical Association, October 4, 1919.



When the anterior fontanel was open the blood was taken from the longitudinal sinus, and when the fontanel was closed from a point at the bend of the elbow and occasionally over the inner malleolus. The original Wassermann test was used and in addition a second test made by using one unit of hemolysin instead of two and incubating the blood over a longer period. Noguchi skin tests were made with minute technic, and readings were made every twenty-four hours for nearly two weeks. The reaction lasted from two to nine days and some cases of induration remained longer. The earliest pustular reaction occurred in two days, although these are not usually the ones to remain the longest.

One hundred and six infants and children were thus examined; the luetin reactions were positive in 79, negative in 18, doubtful in 9; among the negative and doubtful cases there were respectively 12 and 4 under three months, the rest older. In the positive reactions there were 6 under three months, the youngest one month and two days.

In all cases the Wassermann reactions were negative, methods were used to check up these results as carefully as possible, then the luetin reactions were gone over carefully when it was found that among some bottle-fed children the attendant had continued to add syrup of iodide of iron to some of the bottles. Statistics are given as to the legitimacy of the children, their weight and general condition, the milk supply and medical care, etc.

The results of these statistics indicate that the Wassermann test and luetin tests were made accurately, as shown by the controls; the negative Wassermann reactions seem to be due to the fact that these children had been treated before examination and that the blood had not yet become positive. The luetin test seemed to be of greater value than the Wassermann, especially in the first few weeks. In studying such cases care must be taken to exclude the possible effect of the iodides. Congenital syphilis is more frequent in illegitimate than in legitimate children. The mortality from congenital syphilis is great, and when children have survived the first few weeks they do not give as vigorous a reaction as in the first days of life; this is especially true if they have received treatment. There was a skin eruption in cases in which both the Wassermann and luetin reactions were negative, and the younger the infant, the more frequent were the skin lesions.

In 22 instances, 12 occurred in the first three months of life, and among these 10 in which the luetin reaction was negative. Skin lesions then seem to be active at a period when laboratory tests are less useful. These infants were all below the average in weight, nourishment and development. Enlargement of the liver and spleen and lymphatic glands were a constant condition. Snuffles, fissures, affections of the scalp and scaling of the palms and soles were rarely seen, but this may have been due to the fact that most of the infants had been receiving iodide of iron, and these investigations showed that among these foundlings 83.96 per cent. had congenital syphilis. All these cases were considered as proved when there were sufficient symptoms and reaction to exclude a reasonable doubt.

**Responsibility of Physician when Wet-nurse Acquires Syphilis from Child which She Nurses.** Thibierge<sup>129</sup> describes malpractice suits against physicians on the ground that the physician was responsible when the wet-nurse, whom he sent to nurse a child, acquires syphilis from that child. If the physician can show that the wet-nurse had syphilis when she was sent to nurse the child, or if it can be proved that she developed syphilis within the time of incubation, then the physician cannot be held responsible unless it can be shown that the physician was grossly ignorant or careless. He cannot be held responsible for not having, in a difficult case, interpreted syphilitic lesions in the child correctly. If, on the other hand, the physician had given prescription or drugs indicating that he knew the child was syphilitic and did not warn the wet-nurse, he becomes responsible for her infection. If the wet-nurse herself consulted a physician, or if the child was in a public institution in which the physician was an attendant, he can then warn the wet nurse explicitly against becoming contaminated by secretions from the infant or articles soiled by the infant.

Professional secrecy would oblige the physician to remain silent if he were attending physician to the child or family and under these circumstances he cannot tell the nurse that the child is syphilitic.

In some cases suits have been brought against physicians, midwives and institutions who gave a foundling child to wet-nurses without first examining it for syphilis. The writer repeats a caution that a child of a syphilitic woman should never be given to a healthy wet-nurse, even although the mother is only suspected of syphilis. Should a child nursing of healthy woman show signs suspicious of syphilis it should be taken from her and a diagnosis made as rapidly as possible and the wet-nurse given prompt and efficient treatment.

**Megaduodenum in an Infant.** Dubose<sup>130</sup> observed this unusual condition in the fourth child of healthy parents, born after natural labor. The weight at birth was seven and a half pounds. On the third day the child began to vomit yellow fluid; she was then nursed at two-hour intervals and the interval was immediately lengthened to four hours. This produced no effect, and an effort was then made, by reversing the posture of the child, to stop the vomiting, but this was without effect; drugs were useless. When the child was examined two months after birth it had lost two pounds. The child was apathetic and did not cry; the eye had a Mongolian slant; the tongue was larger than normal and slightly protruding. The appearance of the infant suggested cretinism. Vomiting and bile-stained milk or duodenal fluid occurred at irregular intervals.

In order to make an examination the child was given a barium meal with a teaspoon and so much difficulty was experienced that it required forty-five minutes to administer two ounces. The first x-ray picture showed a full stomach, a narrow pylorus and enormous ovoid duodenum, and some barium in the bowels. Ten minutes later the stomach was smaller and the duodenum larger. When the stomach was com-

<sup>129</sup> Bull. m d., Paris, September 27, 1919.

<sup>130</sup> Surgery, Gynecology and Obstetrics, September, 1919.

pletely emptied the duodenum was enormously filled. A short interval occurred without vomiting, and the next picture showed the duodenum regurgitating its contents into the stomach; in three hours and fifteen minutes the duodenum had completely emptied itself into the stomach, which was refilled and distended with the barium meal. Operation was advised, and, under ether, a posterior gastro-enterostomy was done. The pylorus was tied off and the gastro-duodenal serosa brought over this with interrupted sutures. The duodenum was of enormous size, dilated and flaccid. There was no diverticulum, constriction or adhesive band in the duodenum, but the jejunum was collapsed, having the appearance of mechanical obstruction of the intestines. The child was immediately relieved of its vomiting by the operation. Later, small doses of thyroid extract were given and an x-ray examination some time later showed a normal passage of the barium from the stomach through to the small intestines and into the large bowel. The child gained in weight and in strength.

By the operation the dilated stomach was drawn into the jejunum and by the occlusion of the pylorus, bile and pancreatic fluid drained into the jejunum and regurgitation into the stomach was prevented. It is true that the secretions of the liver, the pancreas and duodenum are more largely conserved than if the pylorus were not occluded; regurgitation into the stomach and loss of fluid is lessened.

In performing this operation upon an infant it is essential that the pylorus be occluded. The article is accompanied by a series of x-ray illustrations. A case in an older child was reported by Downes, *Annals of Surgery*, 1917.

**Sympus Apus.** Chelliah<sup>131</sup> reports the case of a stillborn monster with the lower limbs fastened together and an imperfect development of neighboring pelvic organs and pelvis.

Such a condition is sometimes called sirenomelus and also symmelus, the term mermaid fetus and fetus with tailed appendage are sometimes used. The word sympus is best, indicating an absence of the lower limbs. Such a monster belongs to the class of single monsters and is autocytic; the family is that of the teratomelians and the genus is the symmelians.

During the pregnancy of the mother who bore this monster fetal movements were sluggish and toward the end were not felt at all. The amniotic liquid was scanty and the pregnancy terminated prematurely. In all of these cases the monster lived but a few minutes or, at most, hours. In the Leipzig Clinic there was reported an interesting case of siren formation in which the child lived for a week.

The external appearance is that of the termination of the trunk in a flattened anterior and curved posterior portion; this can be folded upward on the anterior surface of the trunk. In one case on record a fused foot was over the right shoulder near the right ear. The abdomen in its lower part becomes narrow as it approaches the lower limbs, and this gives the body the appearance of ending in a point.

<sup>131</sup> Surgery, Gynecology and Obstetrics, October, 1919.



There is no trace of the external genital organs, and posteriorly there is a linear depression, with radiating furrows, possibly indicating a rudimentary anus. Above the umbilicus the body of the infant is normal.

Upon dissection the ischial and pubic bones form a mass which blocks the pelvis; there is a wide cotyloid cavity in which is the large head of the fused femora; the other bones are completely fused and there is no foot. The pelvic organs are absent but the right suprarenal capsule is present; the rectum and appendix are absent and the descending colon ends blindly. There is no urachus and the umbilical cord has only one vein and one artery.

If these are collected it is seen that derivations of the allantois and its vessels are absent and that vessels of the cord are vitelline in origin.

This variety of monster is among the rarest, and is almost completely absent among the lower animals.

**The Blood-vascular System in a Parietal Craniopagus.** Sonnenburg<sup>132</sup> observed twin children delivered in the Madison General Hospital, the united weight being eleven pounds one ounce. The twins were practically in vertical alignment; one was a well-developed female the other an imperfectly developed male. The placenta was almost circular; membranes intact. The cotyledons were normal and intact. At birth one child began to breathe fifteen seconds before the other, and within five minutes both cried vigorously. The twins were joined at the crania and there seemed to be no close relationship in the activities of the nervous system; one could sleep soundly while the other was awake or crying. Pulse and respiration varied in the two. Both at first fed normally, but the one which was imperfectly developed had an imperforate anus and died on the nineteenth day; fifteen minutes later the other died.

To determine the condition of the circulation the bodies were injected with glycerine, alcohol, carbolic acid and barium sulphate. X-ray pictures were then taken. The bones of each skull met symmetrically but did not fuse; the two brains were enclosed in a common dura mater, and, at the line of junction between the two skulls, a circular venous sinus common to the two brains was enclosed in the dura mater, which did not extend far in between the two brains from this sinus. There was a venous sinus corresponding to the superior longitudinal sinus and common to the two brains in which the falx cerebri of one brain was fused with that of the other. Each brain was covered with pia mater. When the brains projected against each other the pia mater of one was partly fused with that of the other. After hardening one brain projected slightly above the other.

A review of the literature shows 4 cases similar to the writer's. The article is well illustrated by x-ray pictures.

From his own observations and that of others the writer concludes that this rare form of double monster is usually the female sex, the head of one individual often faces laterally, backward or in the same

<sup>132</sup> Journal of the American Medical Association, November 1, 1919.

direction as that of the other. The two brains seem to act independently and are normal, and nearly always separated by the pia mater and sometimes by the dura mater. The vascular connection seems to be in the venous sinus of the skull, although in some cases other vessels anastomose.

### OBSTETRICAL OPERATIONS.

**Cesarean Section.** Gueniot,<sup>133</sup> in 1870, collected statistics of Cesarean section to that date. In the eighteenth century he could find but 6 authentic successful cases; in the nineteenth, among 40 cases that had been published, none had been successful. One patient lived to the eighteenth day, dying of tetanus. The writer has had considerable mortality in emergency cases, he believes, for it to be safe, the operation should be done just before term, with abundant preparations. He thinks that one should not wait for labor and should make a high incision into the fundus and drain into the vagina with a large rubber tube for five or six days, irrigating the uterus as necessary. He does not look favorably on the improved technic of extraperitoneal section.

**INDICATIONS FOR CESAEREAN SECTION.** Applegate<sup>134</sup> bases his conclusion on 95 operations; in 31 there was relative disproportion; among these 10 operations were elective, 17 done in emergency and 4 patients had the test of labor in the hospital under observation. Acute dilatation of the stomach caused the death of one mother on the third day. One of the elective operations delivered twin children, the mother having a contracted pelvis, the diagnosis of twins was made difficult by excessive amniotic liquid. In 2 cases there was threatened rupture of the uterus. One of these patients was in her home in the country, where there was no convenience for operation. There was no suitable table and the patient was placed upon a bureau; on the third day infection developed in the abdominal wound, and this was opened and drained; the patient finally recovered. One patient stated that she had gone three weeks over term and had been in labor twenty-four hours; the fetal heart sounds could scarcely be heard and were very rapid, and the patient showed signs of exhaustion. The child weighed eleven pounds on delivery and lived but a short time.

Ten operations were done for dystocia arising from the fetus; these patients had the test of labor, but the fetal head failed to engage. One primipara who had a slightly contracted pelvis and a normal child urged operation with the consent of her husband, because she had been a nurse and had witnessed the suffering of labor and much preferred to take ether and submit to operation. In 2 cases the patients were toxic with eclampsia; they were primiparae with contracted pelvis at or near term, not in labor, and with rigid and thick cervix. One had had four and the other six convulsions; both mothers and children recovered. One primipara had no convulsions but the preliminary symptoms, high blood-pressure and evidence of toxemia; this mother

<sup>133</sup> Bulletin de l'Académie de médecine, Paris, May 13, 1919.

<sup>134</sup> American Journal of Obstetrics, August, 1919.

and child did well. A primipara died twenty-four hours after operation, having had uremic convulsions, with abundant casts and albumin in the urine. In her case, and in 25 per cent. of the others, spinal anesthesia was employed. In 34 patients there was dystocia of maternal origin caused by pelvic contraction or deformity, and 2 of these cases had been operated on before; 3 of the operations done were on the same patient. In the last case the tubes were resected and the stumps cauterized. There were 5 operations done for cyphosis, one mother dying of anemia and 2 being operated on a second time. These operations were elective and followed by sterilization.

There was one interesting case of undeveloped pelvis of the infantile variety caused by coxalgia when the patient was eight years old, and in the treatment of her condition she had lain in a cast for eighteen months. Sterilization was done in this case. In many of these cases of deformity, delivery occurs through the vagina naturally or sometimes by forceps, because the child is badly developed or poorly nourished.

Five cases of placenta previa, 1 of pulmonary tuberculosis, 1 of fibroids complicating labor, 1 of osteocarcinoma of the pelvis required section. In 1 patient Cesarean section and sterilization were followed by large ventral hernia, and in another there was found a complete transposition of the uterus. These patients were brought to the hospital in labor but exhausted, with only slight contraction. Vaginal examination failed to find the cervix, a sinus was finally discovered passing through the abdominal cavity and the cervix, undilated, was found fourteen inches from the vulva opposite the twelfth rib. The uterus had begun to rupture through the serous coat only and also on the posterior wall. On opening the uterus it was only necessary to enlarge and complete the rupture; this woman made a good recovery.

One of the most complicated cases was that of a primipara, aged thirty-eight years, with a funnel-shaped pelvis and the fetus in the transverse position. The abdomen was very large, pendulous, and the patient could not breathe with comfort while lying down; excessive amniotic fluid and abnormal position of the fetus made diagnosis difficult. Several x-ray examinations were made which showed only a shadow transversely above the pelvis, and this shadow seemed to have the outline of a fetus. On vaginal examination the cervix could be reached with difficulty, and the patient had gone two hundred and eighty-five days in pregnancy. She was delivered by elective section. Mother and child made good recoveries.

Summarizing his cases: In the 95 there were 53 elective and 42 emergency. These operations were done on 89 patients, among them 10 were negroes, 7 of whom had rachitis. The writer believes that previous operation always indicates a Cesarean section in subsequent pregnancy, and if this is not done the patient at least should be carefully watched. He does not consider eclampsia alone an indication for operation, but when the cervix is thick and undilatable the pelvis contracted or deformed, so that delivery through the vagina would occasion traumatism and exhaustion operation is indicated. In pla-



centa previa there were three indications: (1) Placenta previa with contracted pelvis; (2) placenta previa with living child and rigid unyielding os; and (3) placenta previa in contracted pelvis with a living child, viable, regardless of the size of the pelvis.

THE RESULTS AND INDICATIONS FOR ABDOMINAL CESAEREAN SECTION. Essen-Møller<sup>135</sup> gives the result obtained by abdominal Cesarean section in the obstetric clinic at Lund. These operations were done in 74 patients for disproportion between the pelvis and fetal head; among these cases there was 1 death from peritonitis. In 8 cases the operation was performed for myomatous tumors; among these, 1 death occurred from ileus. Eclampsia and accidental hemorrhage were indications in 10 cases, with 3 deaths from eclampsia. Seven were done for placenta previa, 1 death from embolism. Stenosis of the vagina was indication in 3 cases, uterus bicornate in 2, sarcoma of the pelvis in 1 and threatened rupture of the uterus in 1. The mortality was 5.6 per cent. There were 9 fetal deaths: 7 before operation and 2 shortly after operation, 1 having a malformation of the cranium and 1 umbilical hemorrhage. This reduces the mortality rate for the children to 1 death in 98.

In eclampsia, in suitable cases, the writer believes that vaginal Cesarean section is indicated, but in primiparæ with vagina poorly developed and cervix small and rigid he urges abdominal operation.

The death occurring from embolism after operation for placenta previa he is not inclined to ascribe to the operation itself, for he has seen similar death after delivery. He would perform Cesarean section for placenta previa only when hemorrhage is profuse and the cervix is not sufficiently dilated to permit version with easy extraction, and when the mother is certainly not infected. He operated in placenta previa in the interest of the mother primarily and has done the operation when the infant was already dead. In fibroid tumors of the uterus he considers the indication for Cesarean section to be absolute. While he recognizes the value of induction of labor in contracted pelvis, often followed by delivery after version, results for mother and child obtained by Cesarean section are better. Version may be useful in prolapsus of the cord and in some cases of infection, but that does not alter the value of Cesarean operation under proper conditions.

In Sweden there was a diversity of opinion regarding the use of forceps in contracted pelvis; the two should not be done in the same case, and if the operator elects to try to deliver by forceps he should be prepared to perform craniotomy in the event of failure. Craniotomy on the living and uninjured child has practically been abandoned. He believes that if uterine contractions cannot bring the child through the birth canal in contracted pelvis an abdominal Cesarean section should be chosen in preference to forceps, version or craniotomy in all cases in which the mother is not infected. If there is the slightest symptom of infection the writer tries version or forceps with the hope of avoiding craniotomy on the living child. When the mother seems

<sup>135</sup> Archives Mensuelles d'Obstétrique et de Gynécologie, April, 1919.

to have no chance of having a living child and where indications are absolute a Porro operation may be done. In his series of 106 cases there were 8 Porros, all of the mothers recovering.

**CESAREAN SECTION FOR UTERINE TUMORS.** Tuffier<sup>136</sup> believes that this operation is better than hysterectomy in patients in whom there are fibromatous tumors of the uterus. The writer has operated on 135 cases, leaving the women in comparatively good condition. During the same period he performed 131 hysterectomies for the same indication. The one great objection to Cesarean section in these cases is the fact that it may render subsequent pregnancies dangerous, but in his experience this has not occurred. One patient, aged nineteen years, had three fibroid tumors removed by Cesarean section and has passed through three normal pregnancies since the operation. An opportunity was given to make an autopsy on a woman who had had Cesarean section several years afterward, and there was no indication of the former operation except a very fine scar line on the body of the uterus. In 3 cases the writer enucleated large tumors at the second or fourth month; one of these patients aborted; this, however, must be considered as unusual.

**POSTMORTEM CESAREAN SECTION FOLLOWING AN INFLUENZAL BRONCHOPNEUMONIA.** Heppner<sup>137</sup> reports the case of a woman, aged twenty-four years, admitted to the hospital in her third labor. The patient was well developed, but on admission was in a moribund state, very cyanotic and toxic. She had been ill for six days before coming to the hospital. There was a moderate bilateral basal bronchopneumonia. Fundus of the uterus was 3 cm. above the umbilicus; the fetal heart could be heard and was not greatly increased in rate. It was impossible to obtain consent for operation, and as the patient was fatally ill, it was necessary to wait until the moment of death and then deliver the child. After over three hours of waiting the mother died and the fetal heart sounds at once became less strong and could scarcely be heard. Postmortem section was done as rapidly as possible and the child was found to be toxic and feeble, but was readily resuscitated and cried; it was not quite at full term, weighing three pounds fifteen ounces. It died twenty-five days after birth from croupous pneumonia with pleurisy. Autopsy showed many alveoli in the lungs, filled with fibrin, with areas of necrosis and foci of round-cell infiltration. This process was most marked around the smaller bronchioles; there was also an inflammatory deposit on the pleuræ. The child was delivered in one and a half minutes after the death of the mother.

**CESAREAN SECTION FOLLOWED BY SECONDARY SUTURING IN THE ABDOMINAL WOUND.** Broadhead<sup>138</sup> reports the case of a patient, aged thirty-seven years, married eighteen years without pregnancy. After life had been felt for about a month a diagnosis of pregnancy could readily be made. The pelvic measurements were normal and there was a large mass of scar tissue in the left ischiorectal fossa, from

<sup>136</sup> Bulletin de l'Académie de médecine, Paris, June 3, 1919.

<sup>137</sup> Journal of the American Medical Association, March 8, 1919.

<sup>138</sup> American Journal of Obstetrics, February, 1919.

which there was a fistula which occasionally discharged. The patient was in a very nervous condition and used alcohol and cigarettes. Shortly after admission to the hospital the blood-pressure suddenly rose to 170; edema of the face and legs appeared; the urine contained 5 per cent of albumin and many red cells, no casts and was very scanty. Under all the circumstances Cesarean section seemed best and was performed, and a living child weighing six pounds five ounces was delivered. There was no hemorrhage during operation; the uterus and abdominal wall closed in the usual manner. Except for the fact that the lochial discharge was unusually profuse the patient did well after the operation. About fifty-five hours after operation the abdominal dressings were found soaked with blood. Upon examination the wound was found open throughout its entire length; there was no trace of the catgut, and in the bottom of the wound lay the omentum, with a very small quantity of dark blood and clotted adhesions to the wound edges. The patient's condition was such that transfusion of blood was considered; immediate examination of her blood showed hemoglobin, 38 per cent; red cells, 2,000,000; color index, 1—; leukocytes, 12,000; blood platelets, 100,000. The wound was again closed, the patient being in fair condition and standing the operation well. The clinical picture was that of purpura, and, accordingly, 800 c.c. of blood were transfused, with very considerable improvement. About an hour afterward pulmonary edema developed but yielded to treatment. The hemoglobin rose from 38 to 70 per cent., and the final blood count showed 3,760,000 red cells. The patient's recovery after transfusion was rapid and complete.

In discussion, A. B. Davis stated that he had seen the opening of the abdominal wound after Cesarean section. In some of these patients there was no evidence of infection. The behavior of the sutures in these cases are extraordinary, as they seem to melt away. In a patient operated upon for the sixth time there had been rupture of the membrane and prolapse of the cord, and on the third morning after operation the intestines and omentum were found in the dressings. Examination of the uterus showed very little trace of the former operations, no bleeding and no apparent infection. The intestines and omentum were returned to the abdominal cavity and through-and-through suture of silkworm gut inserted. The patient made a good recovery.

In carcinoma of the fundus, with the patient in very bad condition, and who had vomiting after operation, the wound opened but was successfully closed. In another, in which the wound had reopened, a knuckle of intestines was found adherent over an old scar; this was accidentally opened but was closed and there was no complication.

**DELIVERY BY THE NATURAL PASSAGES FOLLOWING CESAREAN SECTION.** Williams<sup>139</sup> reports the case of a woman who had a Cesarean section in her first pregnancy for undilatable contraction ring after failure in the forceps application. Her pelvis was normal, but two years after this she gave birth spontaneously to a seven and a half

<sup>139</sup> American Journal of Obstetrics, October, 1919.



pound child. Since she was first heard from she has been delivered by normal labor twice more, the children weighing nine and a quarter and ten and a quarter pounds. The placenta adhered to the uterine scar after the first spontaneous delivery, but the placenta was removed by the hand. Upon examination the scar was found to be somewhat thin at the upper extremity, but in spite of this it gave no trouble during labor. After the second normal delivery the placenta was again retained by contraction of the cervix. The third delivery was normal in every respect.

He cites another case delivered by Cesarean section in the first labor. In the second labor uterine contractions were bad and the patient was delivered by the high application of forceps. Both children weighed six and a half pounds. Then followed a miscarriage at six months and after a year a spontaneous labor with a child weighing five pounds, and the following year a premature labor at seven months, and in all these clinical experiences there was no sign of trouble connected with the uterine scar. He also reports, from the records of another physician, a woman who had a Cesarean section for a dermoid cyst of the ovary obstructing delivery. The pelvis was normal. Some four years afterward this patient was safely delivered through the vagina of a good-sized child. Through the abdominal wall a slight depression could be felt on the surface of the uterus, probably at the site of the scar, but the patient made an uninterrupted recovery. Another patient had one child by forceps; the second by Cesarean section, and in her third pregnancy she went to term and was delivered without complications, the child weighing seven and a half pounds. Another case is added to the record of a patient who has been twice delivered by Cesarean section who had a slightly contracted pelvis. She greatly desired to try spontaneous labor, and her wish was granted, but after two hours of active second-stage labor pains the head failed to descend and the patient was delivered by Cesarean section. At this operation the scar of the former Cesarean section was found to be intact, although it had been subjected to the strain of labor.

From the practice of another physician the writer adds 3 other cases. One had a contracted pelvis of very moderate degree, for which a Cesarean section had been done, and the following pregnancy she delivered herself without difficulty in spontaneous labor. Another had been operated upon for placenta previa by Cesarean section and eighteen months later she gave birth to a child, weighing eight and a half pounds, without difficulty. Another had section for eclampsia fourteen months before coming under observation. While this is not a complete record these cases are enough to call attention to the fact that the uterus after Cesarean section is capable of spontaneous labor.

**CERVICAL CESAREAN SECTION.** In the *Arch. f. Gynäk.*, 1920, cxii, 15, Lichtenstein contributes a paper of considerable length on this subject from Zweifel's Klinik in Leipsig. His material including 143 operations in ten years' time. Among these contracted pelvis without complications was considered an indication in 107. Contracted pelvis with complications, such as prolapse of the cord, threatened rupture

of the uterus, previous attempt at forceps and death of the mother was the indication in 20. In 2 cases the pelvis was normal, but ovarian tumors obstructed delivery. There were 6 cases of eclampsia, in 4 of which the mother died at the moment of operation, in 7 of placenta previa, in 1 of which the mother perished. There was 1 case of neurofibroma molluscum. Most of the operations, done for a relative indication, were in multiparæ who had previously had hard labors with dead children. In 48 cases a transverse incision of the abdominal wall was made, but in the last 95 a longitudinal incision. In all of the 143 cases the cervix was incised longitudinally.

Regarding the treatment of the peritoneum 5 different methods were tried. In 3 cases Frank's method was employed, by which the parietal and visceral peritoneum were sewed together, thus making the operation practically through a peritoneal fistula. In 1 case the extraction of the child tore the visceral peritoneum in two places. In 11 cases Sellheim's method of extraperitoneal operation was employed, by which the parietal peritoneum is opened above the hole in the bladder, and under direct vision the visceral peritoneum is separated from the bladder and cervix and pushed upward. If no other laceration occurs this opening was closed and the cervix was opened. This is not, strictly speaking, an extraperitoneal operation, although it is so described by some writers. In 4 of the 11 cases the peritoneum was opened in 2 in several places. In 2 cases the bladder was wounded, and these were the only bladder wounds in the whole series of operations. These injuries healed by first intention and did not complicate the recovery. One of these patients had afterward a second Cesarean section.

Eleven cases were operated upon after Latzko's method. In this the bladder was pushed to the left or right in accordance with the position or presentation of the child, usually on the left side, and the bladder was distended with 250 c.c. of sterile water. In 5 of these cases the cervix was fully exposed without wounding the peritoneum. In 6 cases the peritoneum was wounded, but not in such a manner as seriously to complicate the operation. In 3 cases this method of operation was abandoned because of the danger of extensively wounding the peritoneum, and the intraperitoneal method was employed. In 1 case the operator pushed the peritoneal and subperitoneal tissue upward to a considerable extent, when hemorrhage occurred from dilated veins and he was obliged to open the peritoneum to check the bleeding. In the second case the bladder could not be pushed to the left, and on attempting to carry it over to the right side the peritoneum was torn. In the third case there were adhesions between the visceral and parietal peritoneum which caused a parietal tear. This condition was the result of pelvic peritonitis following a previous labor. Twelve operations were made after the method of Latzko and Zweifel. In this operation the tissues were separated so widely that the cervix could be incised in the middle line without difficulty. This method, unfortunately, often resulted in considerable hemorrhage. The effort was also made to separate the tissue from the site without necessarily

stripping the peritoneum from the tissues about the bladder. In some cases it was necessary to cut through the ligament of the bladder, and this method was successful in 6 operations. In 4 the peritoneum was torn and in 2 it was torn in a number of places. These peritoneal tears were immediately closed by suture and the operation could be practically an extraperitoneal one.

One hundred and six cases were operated upon by the intraperitoneal method. These include 3 cases in which Latzko's method had to be abandoned during the operation. The remaining 103 were primarily intraperitoneal. This method was first chosen because circumstances were such that the child must be rapidly delivered. The parietal peritoneum was opened by a long incision, the empty urinary bladder was pushed aside, the visceral peritoneum was not separated, but the anterior surface of the uterus was freely exposed and the tissues surrounding the uterus were carefully protected by sterile packs. The cervix was then opened. After the delivery of the child, the cervix was closed with interrupted sutures and the peritoneum by continuous suture. In cases in which labor had not gone to the point of complete dilatation, or where the cervix was not opened sufficiently freely, the upper end of the incision tore into the lower uterine segment.

In no case was drainage through the abdominal wall employed. In one case a rubber drainage tube was inserted from the lower angle of the wound in the cervix through the vagina. This patient had a temperature of 104° F. at the time of the operation.

When one reviews the methods employed in which the attempt made to conduct the operation exclusively as an extraperitoneal one, it is observed that in 33 operations the peritoneum was wounded in 15. In the method of Latzko and Zweifel in 23 operations the peritoneum was torn in 12. It is evident that these methods are not successful in avoiding the wounding of the peritoneum. It is commonly believed that this operation is most successful when labor has gone to the point of complete dilatation, and that in these cases the membranes are usually unruptured at the time of operation. Unfortunately, in contracted pelvis the membranes often rupture prematurely, and in those patients it is exceedingly difficult to make the operation absolutely extraperitoneal. There is also increased danger of infection when the membranes rupture easily. Some writers have drawn attention to the fact that if the peritoneum be greatly distended it may become necrotic after the operation and that this condition may be more dangerous than a clean incision. In the cases reported it has not been possible to accurately ascertain, by bacterial culture, whether these patients were infected or not. The mere presence of streptococci in the interior of the uterus cannot be considered as direct evidence of infection. Nor is it also possible to make a positive diagnosis of the infective nature of bacteria by hemolysis. It is also impossible at the time of operation to accurately estimate the resisting power of the patient to bacteria. The operator must, as a rule, rely upon the clinical symptoms which the patient presents. The fact that some writers report cases said to be infected which do well with this operation is not an accurate



proof of its value, because the presence of infection was not proved beyond a doubt. One must strongly suspect infection when the membranes have been ruptured for a long time, and when repeated examinations outside of the hospital have been made by physicians or midwives or when some attempt has been made to deliver the patient by operation before her admission. Of these factors, great importance must be placed on the rupture of the membranes some time before the patient is brought to the hospital. Among these patients the membranes were unruptured in 74; ruptured at some unknown time before admission in 5; ruptured before the operation in 64; in 43 cases operation was done eight hours or more after the rupture of the membranes. These patients had been repeatedly examined, but in these cases the result of the operation was good. In another patient the membranes had ruptured seven hours before operation and a fruitless attempt to deliver had been made by forceps. A living child was delivered by section and the mother recovered. One patient had been previously delivered because of contracted pelvis by Cesarean section, and was admitted fifteen hours after rupture of the membranes with transverse position and a prolapse of the cord, which pulsed. Intra-peritoneal Cesarean section was immediately performed, a living child successfully extracted and the mother made a good recovery, her wound healing by first intention. It is evident that one cannot say with absolute accuracy that a patient is infected because the membranes have ruptured some time before operation. A moderate rise of temperature is also not a positive contra-indication for operation. During the last ten and three-quarter years the Cesarean section performed in the clinic have been by the cervical method, avoiding the opening of the body of the uterus. The clinical material was lessened in the years of the war, so that the increased frequency of the operation was not due to a greater material. In 11 cases the patients had fever before the operation. In 5 of these the result was good. In 5 the patient had high temperature after operation, in one exceeding  $104^{\circ}$ . It could not, however, be definitely shown that this fever was produced by the operation. In 1 case of eclampsia the patient had fever because she had pneumonia, from which she died on the twenty-ninth day. Another patient had fever in whom labor was complicated by angiosarcoma of the ovary. On the third day after operation the abdomen was again opened, because of occlusion of the intestine. There were 3 cases in which puerperal septic infection was undoubtedly present. One had a temperature of over  $104^{\circ}$  at the time of operation, seventeen hours after rupture of the membranes. Although drainage was freely used the patient's fever continued very high for twenty-five days. Pus formed in the incision and a thrombosis developed. The patient's recovery occurred after forty-six days' illness. In another case the membranes had ruptured thirty-eight hours before the operation, and in extracting the child the peritoneum was torn. After operation the transverse incision suppurated freely and the patient had high fever for fourteen days. Her recovery occupied forty-eight days. The third case had complete placenta previa, with

unruptured membranes, and had been tamponed, and on admission her temperature was 103°. She was very anemic from recent hemorrhage. This patient died on the sixth day from septic thrombosis and embolism. In 129 cases there were 2 deaths, a mortality of 1.4 per cent. The intraperitoneal operation gives as good results as the extraperitoneal. In 94 intraperitoneal there was 1 death (1.6 per cent.) and in 35 extraperitoneal there was 1 death (2.8 per cent.). The occurrence of eclampsia and placenta previa naturally increased the mortality. Of the whole 143 Cesarean sections there were 8 deaths (5.6 per cent.), and among the extraperitoneal in this series the mortality was 8.1 per cent. and in the intraperitoneal the mortality was 4.7 per cent. A detailed report of the cases terminating fatally is given.

Considerable space in the paper is occupied with a discussion of various methods proposed by different writers. This discussion comprises a brief historical review of the development of this method of operation.

In this series 9 children were lost, a mortality of 6.3 per cent. In 3 of these the mother's pelvis were contracted and three mothers had eclampsia. In 2 placenta previa and 1 an angiosarcoma of the ovary. In the 106 intraperitoneal Cesarean sections 5 children were lost, a mortality of 4.7 per cent., and in 37 extraperitoneal Cesarean sections, a mortality of 4, or 10.8 per cent. In 16 cases of intraperitoneal section sterilization was added to the operation by the removal of the Fallopian tubes. Lichenstein has collected from the records of other writers 1000 cases of Cesarean section, with a common mortality of 3.9 per cent.; of these, 532 were intraperitoneal, with a mortality 3.6 per cent.; 468 extraperitoneal, with a mortality of 4.3 per cent. The writer discusses cervical Cesarean section in cases of shoulder presentation and undeveloped transverse position. Many authors consider this as a special indication of the operation. He believes that the operation is well suited for this complication.

He also discusses the condition of the patient on recovery regarding subsequent pregnancy and labor. He was able to trace 34 cases of pregnancy occurring in patients on whom he had operated. Twenty-five of these had been delivered by Cesarean section, 1 by hysterectomy because of rupture of the uterus; 2 by embryotomy; 3 had abortion; 1 premature birth and 2 were seen in consultation with pregnancy at the eighth and fourth months respectively. Six patients had two pregnancies after the first Cesarean section. In 1 the attending physician had produced abortion. One gave birth spontaneously to a living child and in her second pregnancy was again delivered in the hospital by intraperitoneal section. In 3 of these patients the intraperitoneal operation was done in each twice. In 1 of these repeated operations extensive adhesions were found in the region of the bladder. Among these 34 women none of them complained of disability or distress during pregnancy occasioned in any way by the scar. One patient had rupture of the uterus in labor following the operation, occurring between seventeen and twenty-four hours after pains developed. The

patient had a highly contracted pelvis, with complete dilatation of the cervix. At operation the child was found in the abdominal cavity. This patient had been delivered by section and the scar of the first operation remained firm, but the cervical scar of the second had ruptured.

So far as the pelvic condition after operation was concerned 29 patients could be traced. None of these was pregnant. In none of the 29 was there hernia or pelvic adhesion. In 7 there was retroflexion, which could easily be replaced, and in 19 there was antelexion; in 1 retroversion, and in 1 the uterus seemed to be almost transverse in the pelvis and could not be brought into its usual position. Nineteen of these women complained of no distress or pain whatever. In the others, various indefinite pains were reported. There were some abnormalities of menstruation in 3. Three complained of disturbance of the function of the bladder.

The writer reports in details his 7 cases of Cesarean section treated by intraperitoneal cervical section, with the birth of 6 living children.

A comparison between embryotomy and intraperitoneal section is made, which results to the advantage, naturally, of the Cesarean section when infant mortality is considered. From the fact that 114 embryotomies were performed in the clinic, it is evident that this operation has not been entirely abandoned. Before the Cesarean section was so extensively performed, in 114 embryotomies 2 died of peritonitis, a mortality of 1.7 per cent.

**Three Hundred Classical Cesarean Sections.** Richter,<sup>140</sup> in the clinic at Dresden, gives the results of 300 classical Cesarean sections. Of these the results of many have already been published. The author, in his present paper, adds the results of 43 operations to complete the number to 300.

Reviewing the various periods of development of the operation, the first 29 he believes were valuable because of the development of the technic. Silver wire and silk were used as suture material. Various methods of suturing were employed, but not all the essentials of closing the uterine muscle efficiently and the peritoneal covering of the uterus separately were carried out. With the thirtieth operation in 1890 the technic at present employed had developed. Silk was relied upon to close the muscle. In the 300 operations, taking them without classification, there were 19 deaths, a mortality of 6.3 per cent. If one divides the cases under various conditions and indications the mortality is considerably reduced. In the last 71 cases of the series the mortality was 4.2 per cent. In the last 71 cases there were 5 deaths, 1 of which resulted from eclampsia. In 1 the patient had been infected by a physician who attended her in labor and who was taken suddenly with angina. In this case a phlegmonous inflammation of the pelvic tissues was found at autopsy. The patient had been examined five times by the attending physician. A case of eclampsia had foul-smelling amniotic liquid before the operation, and died on the third day from peritonitis. Of the 2 remaining deaths, 1 occurred from

<sup>140</sup> Archives f. Gynäkologie, 1920, No. 112, p. 70.



occlusion of the intestine and the other from fatty degeneration and dilatation of the heart.

The morbidity was 48.3 per cent.; there were 67 cases of considerable fever, with 76 of slight fever. In 12 cases there was repeated section, so that an accurate observation could be made regarding the result of the first operation. There were adhesions in most of these cases; in 3 between the uterus and intestines, but the adhesions did not prove a serious complication. The mortality among the children was 4.7 per cent. Reviewing the results of the operation, the general mortality among the mothers was 6.3 per cent. reduced to 5 per cent. if eclampsia and placenta previa were excluded. The mortality rate among the children was 4.7 per cent., which was reduced to 0.7 per cent. in uncomplicated cases.

THE PLACE OF THE HIGH CÆSAREAN SECTION IN OBSTETRICAL OPERATIONS. Bar<sup>141</sup> has had personal experience in 275 consecutive Cæsean sections performed by himself or his assistants. The results have been so good that he has considerably widened the indications for operation. He does not, however, perform this operation on patients who have even the slightest signs of infection, increase in temperature or inflammation of the vagina. He does not operate during labor except at the beginning, while the membranes are unruptured. In his last 97 operations he operated on only 1 patient who had been in labor twenty-four hours, only 1 after the membranes had ruptured and 9 times after the patient had been in labor less than two hours. The remaining 85 were done before the appearance of the first pains. Bar places the patient in the Trendelenburg position and separated the uterus from the intestines by packs. He makes the uterine incision high on the anterior surface and the ovum is extracted without rupturing the sac; he makes a button-hole incision in the uterus, introduces the finger and separates the membranes as far as possible, while the finger proceeds in separating the membranes; the uterine wall is incised.

When the placenta is low or in the cornu of the uterus and the membranes sometimes tear he proceeds to extract the child in the usual manner. He does not tampon the uterus. Postpartum hemorrhage was not common, but once in the last 37 cases. In 97 cases there was little operative hemorrhage in 22, considerable in 10 and average in quantity in 76; although he does not fear hemorrhage during the operation, he injected twenty drops of ergotin subcutaneously at the time of emptying the uterus. In 2 cases he did extraperitoneal Cæsean section.

Bar's figures seem to disapprove the claim that in the low operation hemorrhage is slight. There is, however, truth in the claim that infection is less liable to occur in the low operation if these are contrasted with the high operation performed without selection of cases, but when the patients are carefully chosen the question of infection is of little importance. He believes the uterus is stronger in subsequent

<sup>141</sup> Bulletin de l'Académie de médecine, 1919, No. 81, p. 571.

pregnancies after the high operation than after the low, and much of the strength of the uterine wall depends on the method of suture. In his last 97 patients done by the high abdominal route, during the last five years, there was slight shock in 1, tendency to intestinal occlusion in 1 and another had increase in temperature; all, however, made good recoveries and were able to nurse the children. He states the mortality of this operation thirty years ago was above 10 per cent. while at the present time it is 2 or 3 per cent. His experience proves emphatically that Cesarean section should be done only on uninfected cases, and that no patient can be regarded as aseptic who has been in labor a long time with rupture of the membranes. When skilful operators perform Cesarean section in selected cases, on patients uninfected and using a simple technic, Bar believes that Cesarean section gives results almost certain to be successful for mother and child.

As regards the permanent results, such as adhesions and rupture of the uterus, he believes that in patients not infected adhesions are slight and do not complicate after deliveries. The risk of adhesions in these patients is so slight that it may be regarded as secondary. In 22 cases in which the operation was repeated the uterine wall was perforating in 1, and in 21 there was thinning of the wall about the scar. One cannot deny that the uterine wall is frequently thinned in labor following the Cesarean operation, but if care be taken in suturing this can be reduced to a minimum. He places his suture widely and deeply, passing them into the mucosa and relying on his selection of cases to avoid infection. In his experience the woman who has had Cesarean section has no serious risk of uterine rupture in subsequent pregnancies.

He would wait for definite indications for the operation, and, if these be absent, he would not perform it. He considers it a serious surgical procedure, but when selected from those patients in whom extraction through the vagina is clearly impossible or dangerous it is justifiable and very successful.

He would give as legitimate indications for the operation some obstruction in the bony pelvis or soft parts which would render extraction difficult and indicate that extraction by forceps or version must be done. Cesarean section is also indicated when some complication makes the rapid ending of the pregnancy or labor necessary. He always enforces the reservation that there must be no risk of infection. Bar also expresses his opinion concerning the application of the operation in some of the accidents threatening pregnancy and labor, as placenta previa and eclampsia.

**Abdominal Pregnancy Terminated by Operation.** Lowe<sup>142</sup> reports the case of a multipara who had had labor pains for a week before coming to the hospital. The patient looked ill, the tongue was dry, heavily coated, and she had a foul taste in her mouth. There was very slight elevation of temperature. The abdomen was very tense and tender and very difficult to palpate; the fetus was above the pubis, a soft elastic swelling on the left side of the abdomen, the uterine souffle could

<sup>142</sup> British Medical Journal, 1919, No. 1, p. 767.

be heard, but fetal heart sounds were not heard. The head was lower in the pelvis and movable and the cervix was a small dimple under the symphysis pubis. There was moderate albuminuria with acid urine. Upon opening the abdomen the uterus was about five months in size and the Fallopian tubes were intact. In a bag the membranes attached to the left broad ligament there was a dead fetus at full term. This was removed, a clamp was placed on the broad ligament and the whole mass removed. The attachment of the placenta was partly to the pelvic colon and also to the broad ligament, and considerable hemorrhage was set up by removing the placenta. As the patient's pulse was very bad, the abdomen was closed immediately, three long gauze drains being left in the lower end of the incision. Intravenous saline transfusion was given, the patient's recovery was complicated by incontinence and failure to retain injection of glucose given by bowel. The patient vomited and the abdomen was considerably distended. The gauze drains were replaced by a single longer piece of gauze inserted behind the uterus. The lochia was scanty. A temperature of 101° developed and a fecal fistula formed, a piece of membrane presenting through the wound. The patient also had phlebitis in the left leg. She finally made a complete recovery.

Dorman<sup>143</sup> reports 2 cases of abdominal pregnancy in which operation was done near term, securing a living child. The first patient was aged twenty-nine years, toxic; treated in the hospital for three weeks without improvement; several fibroid tumors were found of the lower segment and section was done. Before the operation the diagnosis of ectopic pregnancy had not been made. After the removal of the child, profuse hemorrhage occurred, and the sac was rapidly separated from the omentum and drawn out of the abdomen; it was traced to the broad ligament and by using clamp and ligature at the base of the ligament the sac was entirely removed. When the uterus was examined it was found the size of a three months' pregnancy, with four fibroids in its posterior wall. Attached to the left cornu was a pedunculated fibroid as large as a small grapefruit, while there was another attached to the right cornu. Hysterectomy was performed, leaving the left ovary and stump of the cervix. Hemorrhage was controlled by continuous catgut suture in the broad ligament, and the abdomen was closed; the child weighed six pounds fourteen ounces.

The second patient was seen in consultation, giving a history of sudden pain in the right abdomen, and, when seen, had severe shock, with rapid, feeble pulse. This had developed during the night and sudden separation of the placenta seemed a reasonable explanation of the symptom. The patient grew better after receiving morphine. The pregnancy was seven months. There had been nausea in the early months, with severe pain on the right side. A diagnosis of ectopic pregnancy had then been made in another hospital and the patient was advised to submit to operation. She finally entered the hospital for albuminuria, and after some time the abdomen was opened and a

<sup>143</sup> American Journal of Obstetrics, 1919, No. 79, p. 782.



fetal sac found attached to the omentum by large adhesions. This was opened and the child extracted, weighing four pounds, eleven ounces. The sac was closed with clamps and drawn out of the abdomen; the omental adhesions were ligated and severed; the attachment of the sac to the left broad ligament was clamped and the sac removed from the ligament and the left cornu of the uterus; bleeding was controlled by ligature. On the right side of the abdomen near the cecum there were extensive adhesions of the bowels; among these adhesions was a small mass of brownish, clotted blood whose extravasation had evidently caused the pain and shock present when the patient was previously seen. The sac was removed and also the clot. The hematoma which had formed were shut in by the fundus which extended to the right iliac fossa. During the operation the peritoneal surface of the uterus was torn and this was closed with catgut and the abdomen closed; uninterrupted recovery followed.

**The Abdominal Incision in Obstetrical Practice.** Rouffert<sup>144</sup> publishes an interesting and well-illustrated paper upon the value of different incisions in abdominal section in obstetrics and gynecology. He reviews the history of Cesarean section and symphysiotomy, and calls attention to the work of Jorg and Ritgen in their efforts to avoid opening the peritoneum. Salheim, Latzko and Döderlein follow in the same direction, and Polano, in 1911, proposed what he called a posterior cervical Cesarean operation. The technic of linear incision is treated at length and illustrated, and he calls attention to the fact that some writers believe that the transverse incision of Pfannenstiel should replace the longitudinal incision, while other writers decline to accept this suggestion. During labor, abdominal section for delivery requires a large opening in the abdominal wall, and no method can be successful which does not give this. When an abdominal section is done during pregnancy the distention of the abdomen resulting from the condition which requires operation is a frequent cause of escape of abdominal contents during the operation. Thus in removing ovarian tumors during pregnancy this may occur. Furthermore, in these cases the development of abdominal hernia after operation is not uncommon, so that the growing pregnant uterus may be found in practically a hernial sac. The writer concludes that longitudinal median incision in labor and in pregnancy is often accompanied by eventration and a secondary union in the wound. To avoid this the wound should be so closed that the scar is reinforced by muscular tissue. If the nerves supplying the abdominal muscles are injured in the incision, atrophy will follow, and there is a predisposition to hernia. The writer believes that the transverse incision is the better.

In discussion of this paper Fauvre recognizes the value of transverse incision, but believes that hernia does not develop except in cases in which suppuration in the abdominal wound has complicated recovery. The transverse incision disfigures the patient less and is often less complicated in the performance of the operation. Approximately,

<sup>144</sup> Archives Mensuelles d'Obstétrique, November, 1919.

Fauvre uses the transverse incision of Pfannenstiel in 5 cases in the 100, while in the remaining 95 he practises longitudinal incision.

**Puncture of the Uterus in Polyhydramnios.** Wormser<sup>145</sup> describes a case of a patient well developed and apparently healthy, aged thirty-eight years, who sought medical advice in the second month of her fifth pregnancy. The first three gestations had ended in premature labor at six, seven and eight months, with the birth of a dead child. The quantity of amniotic liquid had been greatly in excess, but the patient knew no other reason for the abnormality. An examination had been made in a pathological institute, but nothing had been found to account for the condition. In the fourth pregnancy the patient was treated during the entire nine months with bichloride of mercury and rest in bed, and gave birth to a living child who was then twelve years old and apparently sound. This treatment was instituted in the belief that syphilis was at the bottom of the condition. The Wassermann reaction in both husband and wife had been negative, and examination of the fetus and placenta gave no sign of syphilis. The quantity of amniotic liquid on that occasion had been normal.

When the patient was first seen in the second month of her fifth pregnancy she seemed to be entirely normal. As the treatment by bichloride of mercury and rest had been successful in the former pregnancy it was again instituted; it was, however, unsuccessful, and at the eighth month the uterus was greatly distended and the patient suffered from dyspnea. She was given food free from salt, when the size of the abdomen decreased and she became better. The abdomen again increased in size and labor pain developed, although the breasts had become smaller during the two days previously. After labor, lasting two and a half hours, with breech presentation, the patient expelled a macerated hydrocephalic male fetus and a large quantity of very dark amniotic liquid preceded the birth of the child. Vigorous hemorrhage developed after labor, and the placenta was removed by the hand apparently thinner than normal and with its borders level with the umbilicus. The puerperal period was without fever. The Wassermann reaction was negative.

Later a sixth pregnancy developed and the patient was again put in bed, given food containing very little salt and chlorate of potassium was administered three times daily. Pregnancy seemed to be developing normally and heart sounds could be heard, although faintly. After some time heart sounds ceased and patient felt no fetal movements. The uterus had increased considerably in size. Some slight uterine contraction developed and it was evident that premature labor threatened; accordingly it was determined to puncture the uterus, and, under local anesthesia, this was done on the left side beneath the umbilicus. At first blood escaped followed by a clear amniotic liquid, about 150 c.c. being removed. A second puncture was then made on the right side with a trocar, when a stream of amniotic liquid, resembling water, escaped, about 1600 c.c. in quantity. The fundus of the uterus imme-

<sup>145</sup> Zentralbl. f. Gynäkologie, 1920, No. 6.

diately descended about 1 cm., although fetal heart sounds could not be heard; the patient thought that she felt the movements of the child. Pains developed which were checked by opium and vivornum. The pain subsided and fetal heart sounds could be heard. Six days afterward neither movements nor heart sounds could be elicited and the amniotic liquid had evidently increased. For several weeks it remained without material change, neither heart sounds nor movements could be made out. It seemed evident that the child had died and accordingly labor was induced. Upon rupturing the membranes a brownish amniotic liquid escaped, followed four hours later by the birth, in breech presentation, of a macerated hydrocephalic male child 43 cm. long. The placenta was delivered spontaneously and the puerperal period was without fever. The patient has remained in good health and has not become pregnant since.

The case was one of habitual death of the child in the second half of pregnancy, complicated by well-marked polyhydramnios. The only living child in six pregnancies had been born after a gestation in which the amniotic liquid had not increased beyond the usual quantity. This would indicate that there was some direct connection between the death of the child and polyhydramnia.

The writer comments upon the paucity of our knowledge in these cases. He does not believe that the puncture of the uterus is dangerous for mother or child.

The reviewer has had a similar experience in these cases. In one, an apparently healthy woman, who gave birth after her first pregnancy to an exceptionally vigorous child. The second pregnancy terminated in the birth of a dead fetus, the amniotic liquid being somewhat in excess. In the third pregnancy between the eighth and ninth month the amniotic liquid developed so rapidly and excessively that the mother could not rest, and accordingly labor was induced. This was followed by the birth of a male child, suffering from general dropsy, which made its respiration rapid and difficult. With the hope of resuscitating the child the abdomen was opened and abdominal fluid allowed to escape; this, however, did no good and the fetus lived but a short time. The fetus and placenta were subjected to a very thorough pathological examination, occupying more than three months; deficient development in the liver cells was found, and also in some other portions of the fetal body. The Wassermann reaction was negative for both parents. The mother had habitually dilated pupils and was markedly neurotic.

**Symphysiotomy.** Kupferberg<sup>146</sup> reviews the history of the operation of symphysiotomy and that of pubiotomy, and finds that the mortality for mother and child in both operations is much the same. Maternal mortality in pubiotomy is 2.54 per cent. with the infant mortality of 8.22 per cent. In symphysiotomy, maternal mortality is 2.85 per cent. and fetal 9.6 per cent. He gives the results of 32 cases of symphysiotomy 24 operations by Döderlein method, and 8 by Bumm's method, all the

<sup>146</sup> Zentralbl. f. Gynäkologie, 1920, No. 6.



mothers recovered in good condition; 3 children were lost during labor and 3 shortly afterward. After 11 of these operations spontaneous birth occurred, forceps were used twelve times, version and extraction four, extraction alone twice, embryotomy twice, Cesarean section seven times after the original operation, with the birth of a living child. In the second series of 90 symphysiotomy operations he quotes a maternal mortality of 3.3 per cent., fetal mortality 7.8 per cent. In the fetal mortality there were 3 cases in which the operation had nothing to do with the result. Among these patients, 25 per cent. were primiparæ, with a morbidity of 18 per cent. After the operation spontaneous labor developed in 27 per cent. and in 73 per cent. labor was terminated by forceps or version with, or without, extraction. There was no excessive hemorrhage, and 10 per cent. developed hematoma, thrombosis in 4 per cent., embolism in none. In 5 per cent. of the cases there was laceration of the vagina, all of which healed; in 5 per cent. injury of the bladder or urethra occurred and these recovered, but 1 patient suffering permanently from incontinence of urine. One patient had permanent difficulty in walking but of a very slight degree. The majority of these women, 60 per cent., had recovered in two weeks after operation. The writer urges the value of the operation in properly selected cases.

# DISEASES OF THE NERVOUS SYSTEM.

BY WILLIAM G. SPILLER, M.D.

**Brain Tumor Occurring in Two Members of a Family.** It is seldom that a tumor of the brain occurs in two immediate members of a family, *i. e.*, in brothers or brother and sister. Hermann Hoffmann<sup>1</sup> has been able to find only 2 instances of this in the literature, 1 reported by Besold in 1896, in which a hemangiosarcoma or perithelioma was found near the third ventricle in each case; and 1 reported by Böhmig, in 1918, in which a glioma of the left frontal and temporal lobes and a glioma of the right frontal lobe were found in the two cases. The family form of brain tumor is certainly therefore very rare.

Hoffmann reports a third example. Two brothers showed signs at different ages of intracranial pressure and in both the diagnosis of brain tumor was made. In both, glioma was found, in one brother the location was the left hippocampal gyrus and occipitotemporal lobe; in the other it was the right hippocampal region. The father of these brothers had epilepsy.

In these three instances of family tumor the sex was the same twice, but in all three the tumor in each member of a family was the same for that family, and similar parts of the brain were affected.

**Congenital Tumor of the Brain.** Occasionally telangiectasis of the brain may be suspected when there are similar lesions on the surface of the head, with symptoms indicating a focal cerebral disorder. Such a case has been under my<sup>2</sup> observation. A boy, aged twelve years, had a telangiectasis of his forehead over the left eye, one in the left side of the scalp near the front hairline and a similar one in the left eyeball. He had right hemiplegia, probably congenital. Convulsions implicating all the limbs developed in 1918, and, as they were increasing, operation seemed to be desirable. I thought a telangiectasis of the brain probably existed, and this was found to be the case when the brain was exposed by Dr. Frazier, and only some of the vessels were ligated. The convulsions had ceased for about a year and a half when the boy was last seen.

Angiomas have been classed by some with dermoid cysts, teratoma, cholesteatoma and neuroma as congenital tumors, but Ernest Sachs disputes the propriety of calling these vascular tumors angiomas. A telangiectasis is a congenital dilatation of capillaries without any new-formed bloodvessels, while an angioma is only properly so-called when new bloodvessels are formed. These distinctions are lost sight of in the literature. Cushing also has written on these vascular growths on the brain in association with similar lesions on the surface of the body.

It is not well to ligate many vessels of a telangiectasis of the brain. This fact seems to have received rather scant attention, but I have seen

<sup>1</sup> Zeitschrift f. d. g. Neurologie und Psychiatrie, 1919, vol. li, Nos. 2 and 3, p. 113.

<sup>2</sup> Archives of Neurology and Psychiatry, vol. ii, No. 1, p. 50.

serious symptoms result in 2 cases from too extensive ligation. In 1 case a hemorrhage was found in the brain as the result of ligation and in the other hemiplegia resulted.

The convulsions were general in the case I have referred to above, because probably both sides of the body were more nearly equally innervated from one side of the brain than in a normal child.

**Encephalitis.** ENCEPHALITIS IN MUMPS.—Cerebral complications of mumps fortunately are rare. Tasker Howard<sup>3</sup> refers to the observations of Haden, in which such complications occurred in 9 cases. The cases were characterized by headache, vomiting, frequently stupor, delirium, etc. Lumbar puncture usually showed a moderate pleocytosis of a mononuclear type, and the physical signs of a mild meningitis were present. He believed the condition was mainly encephalitis rather than meningitis.

Howard records the history of 3 cases which presented mild symptoms of meningo-encephalitis in mumps, entirely relieved or much ameliorated by spinal puncture. The spinal fluid showed a moderate pleocytosis characterized by a predominance of mononuclear cells. As to the possibility of syphilitic infection in these cases, two of the patients had negative serological findings and the third, while having a positive Wassermann reaction, repeatedly showed the presence of a Gram-positive coccus in the spinal fluid. Howard, therefore believes that two of the three patients certainly were not syphilitic and the third must have had some infection besides syphilis. He concludes that the condition in his cases was meningo-encephalitis from mumps, although there was no involvement of the salivary glands or testes. He bases this diagnosis on the occurrence of the cases during a mumps epidemic; on the statement that two of the patients had never had mumps in early life while the third had been told by his father he had had mumps, but he could not remember it himself; and on the recovery from the spinal fluid of a Gram-positive diplococcus.

**Encephalitis in Scarlet Fever.** This diagnosis seems to have been justified in a case reported by Paul Schilder<sup>4</sup> because of cerebellar symptoms appearing simultaneously with scarlet fever. These were cerebellar disturbance of speech and of gait of the type of atasia-abasia; incoördination of the limbs resembling intention tremor, and adiadochokinesis, but not nystagmus. There was also some involvement of the right lower limb. The diagnosis was purely a clinical one, and the case adds one more to those of encephalitis occurring in the acute infectious diseases.

**Botulism.** In my digest of last year in *PROGRESSIVE MEDICINE*, I referred to the work of Marinesco on lethargic encephalitis. From his findings he regarded this disease as entirely different from botulism, and as distinguished by its symptomatology and its lesions. However, when one reads the paper by Sisco<sup>5</sup> on botulism he must be impressed by the clinical resemblance of this disease to lethargic encephalitis.

<sup>3</sup> Journal of the American Medical Association, November, 1919, p. 685.

<sup>4</sup> Deutsche Zeitschrift für Nervenheilkunde, vol. lxiv, Nos. 5 and 6, p. 249.

<sup>5</sup> Journal of the American Medical Association, February 21, 1920, p. 516.



Ripe olives have proved to be very dangerous in several instances lately, but as yet green olives have not been known to cause botulism. The presence of the *Bacillus botulinus* and its toxin has been determined in olives which caused symptoms. A filtrate of the liquor in which the olives not eaten were found was toxic to animals into which it was injected. Sisco describes the condition as follows:

The symptoms and physical signs were much the same in all the 6 cases, which occurred in the same family and after eating ripe olives. The onset of symptoms varied from four to fifty hours after ingestion of the food. In general, the onset was gradual and not of such a nature as to cause apprehension on the part of the patient.

The incidence and progression of symptoms was not identical in all the cases, but followed the same course in general. The first intimation of trouble seemed to be rather an indefinite indisposition, followed rapidly by muscular weakness which gradually increased to great prostration. Difficulty in expectorating, thick speech, dryness of the mouth and dysphagia were among the first symptoms noted, seemingly caused by mucus in the throat and possibly by beginning paralysis of the pharyngeal muscles. As the disease progressed the mucus became thicker, glairy and more tenacious, and could not be evacuated either up or down. It was the source of much discomfort. As the paralysis of the muscles of the throat increased, swallowing became more difficult and the ability to speak diminished toward an ultimate complete aphonia. A sensation of choking, with more or less sense of constriction about the throat was noticed early in the disease by four of the patients.

The various eye symptoms were among the earliest manifestations. Dimness of vision, a blurring and mistiness, was noted by all the patients. Diplopia was observed by only 2 of the 6, but it is probable that it was present in the others. Dilated, sluggishly reacting pupils were observed in 3 cases. Ptosis of the eyelids invariably developed.

Vomiting occurred in 3 of the cases and seemed to be associated with large doses of the toxin, which apparently produced gastric irritation prior to paralysis. Mental clearness, maintained until shortly before death, was strikingly characteristic. All the patients were drowsy and somewhat comatose immediately before death. Dyspnea did not manifest itself so much in rapidity as in difficulty of breathing.

Elimination, stimulation and antitoxin formed the fundamental basis of treatment, but the serum therapy in these cases was inconclusive.

From this description, lethargy, so striking in lethargic encephalitis, seems to have been inconspicuous until shortly before death. There is no mention of muttering delirium, and there was no microscopical examination of tissues. The gradual onset, the early ocular palsies, the paralysis of cranial nerves point to disease of the basal parts of the brain as in lethargic encephalitis.

**Lethargic Encephalitis.** A very good summary of the facts known about this disease is given by Flexner.<sup>6</sup> He can give little information as to the prodromal period. He says probably there is an incubation

<sup>6</sup> Journal of the American Medical Association, March 27, 1920, p. 865.

and prodromal period which precedes the onset of the striking subjective and objective symptoms; but thus far these have not been defined. Hence the so-called onset of the disease is usually described as sudden or acute. The latter is, indeed, so striking that the patient is able often to tell the precise hour of a particular day on which he fell ill.

The lethargy he states is present in 80 per cent. of the cases. The chief immediate cause of death reported has been intercurrent pneumonia or paralysis of the respiratory center in the medulla oblongata. Present indications are that the degree of communicability of the disease or susceptibility to it is low. The seasonable incidence seems to be midwinter.

Flexner thinks it is desirable to regard influenza and lethargic encephalitis as two independent diseases although he acknowledges that they have overlapped. Two cases of lethargic encephalitis in a family have very rarely been noticed. The inoculation experiments have not been very satisfactory, but he says that one need entertain no doubt of the infectious and communicable nature of the disease, and he recommends isolation. In his opinion the abortive cases may be more significant than the frankly lethargic and paralytic ones from the public health point of view.

A very excellent summary of the clinical manifestations of this disease is given also by Nonne.<sup>7</sup> The chief features are:

1. Paralysis of the cranial nerves excepting the optic, with disturbance of swallowing, chewing, speaking, respiration, and of the facial and ocular muscles, including the iris.

2. Symptoms of irritation in the limbs, especially in the form of rigidity of the muscles and lessened movement of the limbs, simulating paralysis. In some cases there are tremor, choreiform or athetoid movement and persistent contracture, especially in the face, causing rigidity of expression.

3. Absence of symptoms on the part of the pyramidal tracts. The tendon and cutaneous reflexes are normal.

4. The bladder is affected and must be catheterized.

5. Prostration and wasting of the body are prominent.

6. Lethargy is pronounced, mental functions are only slightly affected, and the disturbance is shown chiefly by apathy and indolence.

7. Fever is present only in a minority of the cases and meningeal symptoms are exceptional.

Nonne discusses the possible relation of the disease to influenza, but comes to no definite conclusion. Others have observed mental symptoms, though they were insignificant in the 14 cases Nonne studied. He, like Buzzard and Siemerling, has noticed the close resemblance to paralysis agitans. He suggests that in future when we observe isolated rigidity of the pupil we should inquire whether the patient has had lethargic encephalitis before we diagnose syphilis, as this disease like syphilis may affect the action of the iris. He presents a very interesting discussion of the symptoms caused by lesions of the basal ganglia.

<sup>7</sup> *Deutsche Zeitschrift für Nervenheilkunde*, vol. lxiv, Nos. 5 and 6, p. 185.

E. Farquhar Buzzard<sup>8</sup> has spoken of certain unusual features of this disease. He has seen high fever, *i. e.*, temperature of 104°, and a rash resembling a very severe measles eruption, in a patient who had a fatal relapse after there had been apparently justifiable hopes of recovery. He has seen the disease in a mother and son, and states that it is very rare to have this disease in more than one member of the same household and has seen no other instance of it. The mother had been much with her son during his illness, and both had a rash.

He has observed a number of cases of lethargic encephalitis in which the symptoms have been so mild the patients have scarcely considered themselves ill. This group is characterized by the insidious onset of slight lethargy, an inclination to fall asleep whenever the patients sit down to rest or read, or a tendency to forget the small things of everyday life, and sometimes by an alteration in temperament. The patients may complain of diplopia which lasts for a few days to a few weeks, or of a general stiffness or slowness in their movements. They may complain that although they are always dropping off to sleep in the daytime their night's sleep is disturbed by restlessness, by mild cramps, or pains in their limbs, so that they wake every hour or two. Headache may never be complained of and fever may be conspicuous by its absence. These mild cases probably have been numerous in England. Early diagnosis in such cases is of great importance, because persons who have inflammation of the brain should not be allowed to carry on their normal activities.

Buzzard speaks of a serious aspect of the more severe cases of encephalitis in which the patients recover from the acute stage of the disease, but are overtaken by more or less disabling sequelæ at varying intervals of time. He refers to the late development of involuntary movements affecting the limbs, jaw or tongue. Some of these patients have passed through an acute illness associated with severe headache, vomiting, fever and other cerebral symptoms which have given rise to the diagnosis of influenza, meningitis, etc. Some of them have displayed involuntary movements during the acute disease, the abnormal activities disappearing in the course of a long convalescence. Some of the movements have been irregular and choreiform, others more rhythmical and limited in their distribution. They are usually arrested by voluntary use of the affected parts and are most obvious when the patient is resting. They cease during sleep, and gradually subside in the process of going to sleep. They do not interfere with voluntary action and are only a source of complaint in that they interfere with the patient's peacefulness while at rest. The involuntary movements occurring during the acute stage may be attributed to the effects of the inflammation on some of the efferent systems originating in the midbrain or brain stem, but the etiology of movements developing weeks or months after all inflammation must have subsided is more obscure.

Buzzard has found that the brunt of the inflammation falls upon the

<sup>8</sup> Proceedings of the Royal Society of Medicine, Section of Neurology, July 9, 1919.



vessels, with the result that arterial and capillary hemorrhages and venous thromboses are of very frequent occurrence. If the brain of a patient who has died months after the acute stage is examined the vessels are found filled with organized clots, and the vessel walls have become so thickened and calcareous that considerable difficulty has been met with in cutting sections. Buzzard therefore attributes the late clinical complications to secondary vascular disturbances.

Barker, Cross and Irwin<sup>9</sup> have found that a cell-count in the cerebrospinal fluid of from 10 to 100 small mononuclears with a positive globulin reaction with negative Wassermann and negative bacteriological smears and cultures is, at the time of an epidemic of encephalitis, strong corroborative evidence of the existence of the disease in a patient in whom the process is for any other reason suspected to exist. They also state that in more instances than accidental injury to a small bloodvessel will apparently account for, a bloody fluid is obtained on lumbar puncture in patients suspected to be suffering from the disease. This point has been noted by other observers, and it seems likely that the well known hemorrhagic tendency in the disease is thus sometimes manifested.

They discuss the relation of lethargic encephalitis to influenza, but state that (1) the incidence of epidemic encephalitis is very low compared with that of influenza, (2) the available data do not permit of the assertion of any direct parallelism of incidence and distribution in the two diseases; and (3) some of the patients who have had encephalitis deny any preceding attack of influenza. Thus until we are sure of the precise nature of the virus of influenza on the one hand and of the virus of epidemic encephalitis on the other, the questions regarding the exact etiological relationships of the two diseases must be left open.

Bassoe<sup>10</sup> has reported cases in which lethargy and other common symptoms of the characteristic lethargic form may be lacking. That we are dealing with the same disease is shown by the similarity in pathologic anatomy, the existence of transitional forms, and the occurrence of all these forms in the same community at the same time. Among cases observed several have presented severe symptoms of a general infection suggestive of typhoid fever, acute miliary tuberculosis or other acute infectious disease. In other cases, verified by necropsy, the resemblance to severe, acute chorea was marked. Bassoe, like Reilly, has observed twitching of the abdominal muscles. I have observed these twitches in all parts of the body, and have also observed the severe pain in the extremities, which Bassoe connects with the cases of "infective neuronitis."

Loewe and Strauss<sup>11</sup> have found that the Berkefeld filtrates of nasopharyngeal washings from cases of epidemic encephalitis produce characteristic lesions when injected intracranially into rabbits. This finding served them as an aid to diagnosis in 78 per cent. of the cases so tested.

A minute filtrable organism, identical with that described before by

<sup>9</sup> American Journal of the Medical Sciences, February and March, 1920.

<sup>10</sup> Journal of the American Medical Association, April 10, 1920, p. 1009.

<sup>11</sup> Ibid, May 15, 1920, p. 1373.

them, was recovered in eleven of the seventeen nasopharyngeal washings cultivated, or 64 per cent.

Inoculation of rabbits with the cerebrospinal fluids of patients with epidemic encephalitis confirmed the diagnosis in twelve of the sixteen fluids injected, or 75 per cent.

Cultures of cerebrospinal fluids were positive in 10 out of 20 cases, or 50 per cent.

They believe their positive results with cerebrospinal fluid sharply differentiate this disease from poliomyelitis. Their control studies were uniformly negative.

**Cerebral Hemorrhage of the Newborn.** This condition occurs more frequently than is generally supposed. Margaret Warwick<sup>12</sup> states that:

1. Cerebral hemorrhage of the newborn is frequently found, occurring in 50 per cent. of 36 deaths of young infants at the University Hospital, Minneapolis.

2. The condition is brought about by trauma in normal or rapid deliveries, by congestion or asphyxiation in slow deliveries or by disease of the child itself.

3. The so-called "hemorrhagic disease of the newborn" is a much neglected, but very important cause of cerebral hemorrhage in infants, occurring in 44 per cent. of the deaths of her series. In this condition hemorrhage is not confined to the brain.

4. Forceps deliveries, advanced age of the primipara mother and syphilis probably do not play as important a role in the etiology of this condition as was formerly supposed.

5. More careful and complete routine autopsies on newborn infants as well as more accurate observations on the conditions of the mothers and circumstances of the birth are needed as a foundation for further studies.

**Benedikt's Syndrome.** Under this designation is meant crossed hemiplegia, of the limbs on one side and of the oculomotor nerve on the other side, associated with tremor. The lesion may be of different character, but the location is the cerebral peduncle on the side of the oculomotor paralysis. The designation was suggested by Charcot.

Bartel<sup>13</sup> reviews the literature on the subject and reports a case. He concludes that the tremor in the syndrome described by Benedikt is made by regular movements, continuous even when the patient is at rest, and may be interrupted occasionally for a short time. The tremor is like that of paralysis agitans, multiple sclerosis, chorea or athetosis, or it may resemble more than one form. In many cases intentional movement increases the tremor, but this is not true of all cases. The lesion must be in the tegmentum of the cerebral peduncle, affecting the superior cerebellar peduncle but especially the nucleus ruber, and this location has been established by all necropsies obtained. It is not possible to explain the different forms of the tremors according to the location affected. In 4 cases the lesion was vascular, in 10 it was tumor.

<sup>12</sup> American Journal of the Medical Sciences, July, 1919, p. 95.

<sup>13</sup> Archiv. f. Psychiatrie und Nervenkrankheiten, vol. lxi, No. 1, p. 247.

**Unilateral Anesthesia of the Cornea and Conjunctiva in Coma with Hemiplegia.** A sign which may be of service is reported by Friedman,<sup>14</sup> but it should be investigated further. The coma may be in a postepileptic state, uremia, some toxic condition, or hysteria. The sign consists of unilateral anesthesia of the cornea on the side of the hemiplegia, that is, the side opposite the lesion. Friedman says it has long been known and recently emphasized that the unilateral diminution, or absence of the abdominal wall reflexes, is an important sign of hemiplegia. Where the patient is a woman and has flabby abdominal musculature, it is difficult to elicit this sign. In such a case especially the unilateral absence of the corneal reflex is very helpful.

The corneal reflex is a consensual reflex. The introduction of a foreign body into one eye produces a winking reflex in both eyes. In eliciting the reflex one must guard against reaching the pupillary area because of the possibility of obtaining a visual reflex, which is present even in moderately stuporous cases. Friedman has found this reflex absent in practically all hemiplegia with, and without coma.

The only reference to this subject he could find in literature was to a paper by Milian. This writer attributed the loss of the reflex to the lesion of the facial nerve, that is, to impairment of the motor arc. Friedman takes issue with him, because if the absence of the reflex were caused by interference with the motor arc, the consensual reflex should still be present on the other side. The sign should also disappear with the return of innervation of the facial nerve, which occurs in many cases. He found no evidence of a consensual reflex, and, in some cases, he was able to elicit the reflex on the paralyzed side by testing the cornea of the healthy side. This, to his mind, proved that the abolition of the reflex was not caused by interference with the motor arc, but was caused by anesthesia of the cornea and conjunctiva. In cases with uncomplicated lesion of the motor tracts this sign tends to disappear after a few days.

Among his observations there have been many cases in which this has been the only sign of hemiplegia. The sign he thinks should be of special value to the ambulance surgeon. It would help him in the differentiation of comatose states, so that he would not be too ready with the diagnosis of alcoholism. It may be important from the standpoint of therapy. With the diagnosis of hemiplegia the treatment will necessarily be purely expectant and different from the active treatment necessary for uremia.

Before we can accept the importance of this sign, further study should be given to the subject.

**Segmental Cerebral Monoplegia.** It does not seem to be generally recognized that a small portion of a limb, as for example, the hand, may be paralyzed with escape of the remainder of the limb from a lesion of the cerebral cortex. A paralysis of this type might be mistaken for a lesion of peripheral nerves, when in reality the cause may be a tumor of the brain, and the danger of error is increased when there has been

<sup>14</sup> Journal of the American Medical Association, vol. lxxii, No. 25, June 21, 1919, p. 1812.



no head trauma. A paralysis when confined in the upper limb to the shoulder muscles may be associated with weakness or even complete paralysis of the hip muscles or of all those of the lower limb of the same side. When confined in the upper limb to the hand muscles it may be associated with partial or complete paralysis of the face of the cerebral type and with paralysis of the tongue, on the same side as the hand paralysis. The explanation of this association is to be found in the propinquity of the hip center to the shoulder center, and of the hand center to the face center.

In one of my<sup>15</sup> cases a paralysis confined to the left hand occurred rapidly, but after a few weeks convulsions on the left side and left hemiplegia developed and the diagnosis of brain tumor was confirmed by operation. In another case the right hand alone was weak, the sense of position was greatly impaired, and stereognosis was lost in this hand. The muscles of the right corner of the mouth were a little weak and the tongue when almost fully protruded deviated a little to the right. Convulsions had begun in the right hand in the onset of symptoms and beginning papilledema was discovered. A small tuberculous lesion was found in the center for the upper limb.

Four cases are reported in my paper, but recently I have had a fifth similar case.

**Cortical Localization of Vision.** Gordon Holmes<sup>16</sup> has made important observations on the cortical representation of vision from soldiers who had received injuries of the head in the occipital region. He has found that when blindness of the lower homonymous quadrants of the visual fields occurs as a result of cortical injuries, it is always associated with wounds above the level of the calcarine fissures. These cases prove that the upper halves of the retinae are represented in the upper or dorsal parts of the visual cortex, just as the lower segments of the retinae are projected on to its lower portion.

If a lesion of one occipital lobe above the level of the calcarine fissure produces an inferior quadrantic hemianopsia, bilateral lesions in this position should cause blindness below the fixation-point. He has seen eight cases of more or less pure inferior horizontal hemianopsia, and in all of these the cerebral wounds were above the level of the calcarine fissures. He has not observed a pure case of superior horizontal hemianopsia; the probable reason is that gunshot wounds involving the lower portions of both striate areas constituting the visual cortex would necessarily produce such injury of the torcula as probably would be fatal.

The most satisfactory evidence on which to base conclusions regarding the cortical localization of central vision would be obtained from cortical lesions that produce complete loss of central vision in both eyes. In all cases in which there is superficial injury of both occipital poles, that is, by wounds that injure the posterior parts of the striate areas, peripheral vision is intact and central vision is abolished. These cases are evidence that central or macular vision is represented in the most posterior parts

<sup>15</sup> Contributions to Medical and Biological Research Dedicated to Sir William Osler.

<sup>16</sup> British Medical Journal, August 16, 1919, p. 193.

of the visual areas, and that this region is not concerned with peripheral sight.

An injury of the right occipital pole, for example, involving the posterior end of the area striata, causes a left homonymous paracentral scotoma, which extends up to the fixation-point, and usually its size can be seen to bear a close relation to the depth of the wound.

Smaller paracentral scotomata are frequently limited to either the upper or lower homonymous quadrants. Their position in the field of vision always bears a close relation to the site of the wound—that is, they lie below the fixation point when the injury involves the upper and posterior end of the calcarine area, and above it when the ventral portion of the visual region is damaged. Bilateral paracentral scotomata are less common.

While the macular and perimacular regions of the retinae are represented at or near to the occipital poles of the hemispheres, it is probable that the portion of the area striata which frequently spreads over the occipital pole and onto the lateral surface of the brain may be the center of macular sight. The frequency of paracentral scotomata is accounted for by the more exposed position of this part of the visual area than of that which lies on the mesial surface of the hemispheres. It seems probable that the maculae have anatomically larger representations in the cortex than the less highly specialized peripheral zones of the retinae have, and in this we may find the explanation of the frequency of small areas of blindness in the neighborhood of the fixation point, though the causal lesions may be relatively gross.

Holmes argues that if all experience points to a posterior representation of macular vision in the calcarine region we may by exclusion assume that the center for peripheral vision lies in the anterior part of the visual areas. He acknowledges there is relatively little direct evidence of this, but there is some. Riddoch has observed a case in which peripheral contraction of both halves of the visual fields was associated with the presence of a missile and fragments of bone between the mesial surfaces of the occipital lobes, in such a position that the anterior parts of the areae striatae probably were injured, and Holmes has recorded a case with loss of peripheral vision in the homonymous fields in which a missile was localized at the junction of the calcarine and parieto-occipital sulci.

The homonymous hemianopsia that is produced by a penetrating gunshot wound of one occipital lobe differs from the ordinary form of hemianopsia caused by vascular lesion met with in civil practice. In the latter the blindness rarely reaches up to the fixation-point. The explanation for this offered by Holmes is in the anatomical arrangement of the arteries that supply the occipital poles. Here, in the region of the posterior end of the striate areas, where the center of macular vision is placed, the middle and posterior cerebral arteries meet, and if the circulation in the branches of the one is blocked by an embolism or thrombus the portion of the brain in this watershed area may obtain arterial blood from the branches of the other, since there is always a certain amount of overlap.

**Intracranial Lesions from Scalp Wounds.** Scalp wounds may be far more serious than they appear at first sight. This can hardly be said to be a new idea and yet Geoffrey Jefferson<sup>17</sup> has done good service in using his extensive material to emphasize this matter. An analysis of neurological symptoms and signs presented by a series of fifty-four scalp wounds treated in France showed that such signs were frequently present, as in only five were no such signs discovered. He makes two classes of cases, those in which the changes are concussion and general; and those in which signs of a definite local cerebral contusion make themselves apparent. Seventeen cases of localized cerebral contusions were found in this series (31.5 per cent.), but these figures are considered too low. Something over 40 per cent. is probably more accurate. In the majority of cases the symptoms are of a transient character and are not often very apparent.

In none of his series was there any injury to the skull, yet there were eleven definite local contusions of the motor cortex, four of the visual, and two more in which a motor lesion was associated with a sensory disturbance of the hand. Three patients presented Jacksonian seizures, and three were trephined on the neurological evidence; in two an extradural clot was found; in one, nothing abnormal was found. There were signs of contralateral injury by contrecoup in 4 cases.

Jefferson believes scalp wounds in civil practice are not so likely to produce intracranial lesions, as the force which produces them is usually less than that of a high velocity projectile, and yet in *International Clinics* in 1903 I called attention to the occurrence of traumatic intracranial hemorrhage without fracture of the skull.

**Symptoms of Frontal Lobe Lesion.** Lesions of the frontal lobe have been difficult to diagnose, as the signs produced by such lesions are not definite, and therefore the statement of Marie and Béhague<sup>18</sup> that we know very little about the function of the frontal lobe apart from the ascending frontal convolution is correct. Intellectual deficit has been recognized as a result of frontal lesion. Marie and Béhague do not believe ataxia and apraxia have occurred from lesions strictly confined to the frontal lobe, although certain writers have regarded them as frontal symptoms. They speak of anarthric or dysarthric symptoms resulting from lesions of the left frontal lobe. This denial of the existence of frontal lobe ataxia is interesting, as some writers have called attention to the difficulty of distinguishing between frontal lobe ataxia and cerebellar ataxia. I have never found this difficulty to exist, although I have been alert to the possibility. Marie and Béhague believe that the cerebellar symptoms occurring with lesions of the frontal lobe are produced by pressure upon or irritation of the cerebellum at a distance, and inasmuch as no symptom-complex of frontal lesion exists they undertake to define one. Their paper is one of the really valuable contributions of the war to neurology.

This complex consists of disturbances of orientation in space, but not in relation to time, and they add, in the absence of all objective

<sup>17</sup> Brain, 1919, vol. xlii, part 2, p. 93.

<sup>18</sup> Revue Neurologique, 1919, No. 1, p. 3.



signs of a lesion of the nervous system or vestibular system. They describe several cases.

One man dared not leave the ward in which he was placed, as he feared he would lose himself. If he descended into the yard it was impossible for him to find his ward, although he knew perfectly the name and situation of it. In attempting to go to it he did not know whether to turn to the left or to the right, and was obliged to have some one guide him to his bed. His memory was acute and he employed various subterfuges to help him. He marked the walls and wrote near the door of his ward: "Turn to the left and then turn to the right." If someone erased these directions he erred greatly and might not recognize the door of his room. If darkness came on while he was away from his ward his difficulty was increased, and he had no idea of the direction he should take. He could never go a part of the way with his eyes closed.

Many persons with frontal lobe lesion on questioning may not reveal any disorder of orientation, and then certain tests should be made. If the walls of the apartment in which the patient is are designated in some way, as the "wall where the table is," "the wall where the bed is," etc., and the patient is then blindfolded and made to turn around first in one direction and afterward in another, or is made to walk in a circle and the examiner changes his position so as to avoid giving assistance in orientation by the sound of his voice, the patient will be unable to say where he is while the eyes are still blindfolded. A normal person will have no difficulty under similar circumstances.

The symptom-complex described above occurs from lesions of the frontal lobe only when the lesions are deep, and many slightly wounded persons present none of these signs. The intensity of the dysorientation depends upon the intensity of the lesion. It seems to matter little whether it is the right or the left frontal lobe that is affected.

**Disturbance of Sensation from Lesions of the Sensory Cortex.** Probably no one has carried the study of disturbances of sensation so far as has Henry Head<sup>19</sup> and his recent monograph on sensation and the cerebral cortex is a comprehensive work. He has found that sensibility to touch, heat, cold and pain is never abolished as the result of a true cortical lesion, provided the period of shock has passed off and epileptiform attacks are absent. This is truly a remarkable observation, for neurologists by no means are aware that a complete loss of anyone of these forms of sensations is never caused by a lesion confined to the cortex, even when it destroys the cortex of the entire parietal lobe. This sensibility may, however, be profoundly modified. The change shows itself first in the patient's introspective recognition that the sensation obtained from the normal and affected parts is not similar. Next, this difference may become manifest in a raised threshold, a stronger stimulus may be necessary to produce perfect answers regarding sensation. A still graver disturbance is shown by inability to obtain a threshold within reasonable limits; increasing the strength of the stimulus does not of necessity produce a perfect series of responses, and such records are liable to be

<sup>19</sup> Brain, 1918, vol. xli, part 2, p. 57.

disturbed by hallucinations and other irregularities of response. At this stage of dissolution, the patient may not be able to appreciate with certainty temperatures between about  $26^{\circ}\text{C}$ . and  $40^{\circ}\text{C}$ ., nor to discriminate between two hot or two cold stimuli, easily recognizable on the normal hand.

Whenever the graduated tests for touch, heat, cold or prick demonstrate that sensibility is changed, the tactile hairs always discover the gravest disturbance, heat and cold are less, and prick least affected. Not only the loss is more intense over any one part, but also it extends to a larger number of digits on the hand, for the whole hand may not be affected.

This is probably due in part to the more delicate and complex appreciation required by the test of the tactile hairs, compared with the crudity of those we can apply clinically for heat, cold and especially for prick. It depends also on the relative extent to which these stimuli appeal to the activity of the optic thalamus. A prick, as far as its painful element is concerned, depends for recognition almost entirely on this organ, while the "pointedness," "clearness," "sharpness" are the result of cortical activity. On the other hand, the graduated hairs used for touch sensation require for their appreciation a reaction to different intensities; this reaction must be constant and correspond relatively to the strength of stimulation. When once the maximum threshold has been exceeded, the answers must be free from gross irregularities. All these factors in contact-sensibility depend on the sensory cortex and are therefore most disturbed in consequence of lesions of this part.

All these changes in sensibility can be grouped together under the heading of defective appreciation of intensity; for at bottom, they depend on an inconstant reaction to graduated stimuli. This tends to produce that characteristic confusion and want of definition, which are manifest throughout the records of touch, pain, heat and cold in many cases of cortical injury.

A lesion of the sensory cortex can produce hypotonia provided the motor activity of the pyramidal system is intact. If, however, the highest grade of voluntary motion is disturbed, the fingers either show no obvious change in tonic innervation, or, if the lesion is more severe, fall into a condition of spastic rigidity or flaccid paralysis.

Recovery of motor power without coincident restoration of postural sensibility should lead to the gradual appearance of hypotonia in the affected fingers.

Some loss of power to recognize passive movements of the affected part forms one of the most frequent consequences of injury to the sensory cortex. This test is a means of investigating the appreciation of special relationships in three dimensions; the compass test and "spot-finding" (topical localization) are explorations in two and one dimensional recognition.

Vibration sensation is never lost as the result of a cortical lesion, unless it is associated with epileptiform attacks or other causes of shock; for vibration appeals both to the optic thalamus and to the cortex. Vibrations may be appreciated for a shorter period over the parts affected by a lesion of the sensory cortex.

Those portions of the body, such as the hand, which are endowed with the highest powers of discriminative sensibility, are most exclusively represented. Next in order comes the sole of the foot, which constantly exerts a discriminative action in walking, hence a cortical lesion may disturb the sensibility of the hand and foot without of necessity affecting the elbow, shoulder or knee. This explanation offered by Head is more satisfactory than that which demands the acceptance of two distinct lesions causing disturbance of sensation confined to the centers for the hand and foot.

**Heteresthesia.** This is a word coined by Purves Stewart to describe the difference in the degree of sensation experienced by the subject when stimuli of equal value are applied to different parts of the skin or other sensory receptive field. As described by T. Graham Brown and R. M. Stewart,<sup>20</sup> in a certain number of cases of concussion, when a stimulus of a constant strength, as the scratch of a pin or the faradic current, is drawn across the skin, the subject states that an apparent change in sensation occurs at certain lines of demarcation which are found to be comparatively stable. They have observed this phenomenon in 2 cases of compression of the cervical spinal cord after fracture-dislocation of the spine, in 1 case of fracture at the base of the skull with severe concussion, and in 6 cases of concussion from shell burst. The phenomenon may be transient. It consists in an apparent change in sensation when the moving stimulus crosses certain lines; in a variation of apparent strength of stimulus as the line is crossed. The line at which change occurs seems to be comparatively constant, but the change is not always constant in direction. At one time, when the stimulus is drawn across the line, the change may be one of apparent increase in value; while at another time, when the stimulus is drawn in the same direction, the change may be one of apparent decrease in value. The writers realize that mistakes may occur very easily and yet they believe the phenomenon they describe occurs independently of suggestion. Certainly the condition is one which demands the greatest care in examination.

**Pain of Central Origin.** The pain of optic thalamus disease has been attributed to irritation of sensory fibers, but Head and Holmes concluded that these peripherally projected pains are not caused by irritation of central conducting tracts, they are a consequence of the removal of the inhibitory control which the cerebral cortex normally exerts on the subcortical center concerned in the perception of this form of sensation. They assumed that this center lies in the inner division of the optic thalamus.

Holmes<sup>21</sup> says that practically the only other central lesion which produces similar pain is disease of the medulla oblongata and the lower part of the pons. He now states, however, that during the late war he saw a large number of men with spinal injuries, and a few of these suffered with peripherally referred pains that could not be attributed wholly to irritation of sensory roots. He regards these cases as showing pain of medullary origin, from disease of the spinal cord. These pains are most

<sup>20</sup> Review of Neurology and Psychiatry, vol. xvi, Nos. 7 and 8, p. 225.

<sup>21</sup> Contributions to Medical and Biological Research Dedicated to Sir William Osler.



common after gunshot wounds which produce concussion changes alone, or in addition slight direct injury of the cervical enlargement. They frequently radiate widely and diffusely through the arms and shoulders, and spread into the neck and across the upper part of the chest. When they are severe the patient can often not localize them more narrowly, but if less intense they may be limited to, or be more constant and persistent in one or the other region, which rarely corresponds approximately to the peripheral distribution of a dorsal root.

These pains while more or less constant and extremely severe, may be excited or increased by all peripheral stimuli. Even the light contact of a finger or the touch of a wisp of cotton-wool evokes or aggravates them, but it is particularly movement of the affected parts that is dreaded by the patient; his arms invariably lie motionless, and any change of their position produces such agony that he fears to bring them into a more comfortable attitude. Even a slight jar to the bed may bring on a bout of intense pain, and if the condition is severe the patient may resent the step of a passer-by which transmits an otherwise imperceptible vibration to it. Holmes says that during more than four years' work in military hospitals, he has not seen any condition associated with such intense suffering. Men with strong self-control who have borne themselves bravely through other experiences may break into tears and beg importunately for morphin, and more than one man has prayed for death as a relief to the even temporary continuance of his intolerable sufferings.

The pains are only temporary, and as a rule they reach their maximum in the second or third day and begin to subside toward the end of the second or third week. He knows of no patient in whom they persisted unabated beyond a month or so after the infliction of the wound, and in several they had disappeared completely within this period.

The changes in the spinal cord in the cases with these intense pains are comparatively mild and Holmes believes they do not interrupt conduction. They may modify the impressions that pass through the affected fibers, and it is to this that he attributes the alterations in the sensations worked by stimuli in the hypersensitive regions. The so-called spontaneous pains, in so far as they are independent of peripheral excitements, are probably caused by the irritative effects of these lesions of the conducting fibers; and the rarity of these pains probably depends on the infrequency of that type and degree of pathological change that can irritate the fibers and yet not block conduction through them.

**Lumbar Puncture as a Factor in the Causation of Meningitis.** A very interesting and important paper on this subject has been given to us by Wegforth and Latham.<sup>22</sup> It has been found clinically, they say, that infections of the meninges occur not infrequently following the release of normal spinal fluid by lumbar puncture during a septicemia. Five such observations were made by them and similar cases have been found in the literature. The close analogy existing between these cases and certain experimental observations reported elsewhere indicate that the withdrawal of spinal fluid should be seriously considered as a causa-

<sup>22</sup> American Journal of the Medical Sciences, August, 1919, p. 183; Strauss, Archives of Neurology and Psychiatry, January, 1920, p. 71.

tive factor in the production of meningitis under certain conditions. To prevent the possible accidental production of a meningitis as a result of diagnostic lumbar puncture it is recommended (1) that careful consideration be given the bacteriological study of the blood before such punctures are attempted; (2) that in acute diseases, in the absence of definite signs of irritation of the central nervous system, lumbar puncture should be avoided unless it is first conclusively shown that the blood stream is free of infection; (3) that when the symptoms are such as to render a lumbar puncture advisable, minimal quantities of fluid should be withdrawn, sufficient only to permit necessary laboratory tests to be made; (4) that small-bore needles should be utilized in performing the operation to prevent as much as possible subsequent leakage of spinal fluid into the surrounding tissues.

A careful critical review of this paper is made by Strauss in which a very different point of view is entertained.

**Cerebrospinal Fluid in Acute Disease.** The conclusions which Herrick and Dannenberg<sup>23</sup> reach in regard to their study of the cerebrospinal fluid are:

1. A review of the literature and a personal study of 76 cases not resulting in meningitis show beyond question that the cerebrospinal fluid often gives evidence in increased pressure, pleocytosis and heightened globulin content of a reaction on the part of the leptomeninges to the infective agents or toxins of a large number of miscellaneous acute diseases, not ordinarily causing true meningitis.

2. These diseases are lobar and bronchopneumonia, influenza, tonsillitis, the exanthems, scarlet fever, measles, variola, herpes zoster, parotitis, typhoid fever, sepsis, arthritis, pleurisy, migraine, reaction to typhoid inoculation and others.

3. The cerebrospinal fluid shows variation from the normal in about one-third of all the cases studied.

4. Most, but by no means all, of the patients with subarachnoid reaction have clinical meningismus, but many examples of meningismus are without pronounced changes in the cerebrospinal fluid.

5. The greatest caution should be used in making a diagnosis of meningitis or poliomyelitis from fever, meningismus and the changes in the cerebrospinal fluid mentioned. Cases with less than 100 cells should be viewed with skepticism, unless clinical, epidemiologic or other laboratory evidence is decisive.

**Spinal Fluid in Persons Without Nervous Disease.** Usually a lumbar puncture is done only when there is some reason to fear some disorder of the central nervous system, and reliable statistics of the reaction of the spinal fluid from those who have given no signs of nervous disease have not been available. This gap Schönfeld<sup>24</sup> has bridged by the study of the fluid obtained in 326 punctures on 127 persons, who in the skin clinic of Würzburg had gonorrhea or cutaneous affections. Many of these were females. His findings are important and are as follows:

The cell count by the Fuchs-Rosenthal method is normally no cells

<sup>23</sup> Journal of the American Medical Association, November 1, 1919, p. 1321.

<sup>24</sup> Deutsche Zeitschrift für Nervenheilkunde, vol lxiv, Nos. 5 and 6, p. 300.

to 5 cells to the c.mm., 6 to 10 cells are on the border but may still be within the normal, while more than 10 cells should be regarded as pathological.

Occasionally but rarely healthy persons, or at least those who have no nervous disease, may show a positive phase 1.

The Pandy reaction may be positive in normal fluids in 42 per cent. of the fluids or 59 per cent. of the cases; the Weichbrodt reaction may be positive in 58 per cent. of the fluids or 68 per cent. of the cases.

When punctures are done too frequently in those with normal spinal fluids there may be increase of the cell count as well as of the albumin content. In practice an interval of ten days should be allowed to occur between the punctures in the same case. The Wassermann reaction is not obtained by too frequent puncture.

**Epidemic Cerebrospinal Meningitis.** Sailer<sup>25</sup> recognizes four strains of the organism of this disease, but we have not sufficient evidence to determine the relative virulence of these strains. This is because typing has been rarely done. Carriers of the organism are of three types, those in the premeningeal stage of the disease, casuals and chronic carriers. Incubating cases will soon be recognized and contact with other people will be prevented. Casual cases clear very rapidly, in a few days or a few weeks. The chronic cases seem to resist most of our methods of clearing them. In prophylaxis we may isolate the carriers and attempt to destroy the meningococcus. The former is difficult in communities and regarding the latter the statements are contradictory. Sailer has found dichloramin-T used as a spray or snuffed into the nose and allowed to run out of the mouth, the best method for clearing the nasopharynx, it was excellent for the casual cases, but of no value for the chronic carriers, and these are the important ones.

Epidemic cerebrospinal meningitis is not actively contagious in wards of hospitals and cases of hospital infection are extremely rare. They do nevertheless occur and justify local treatment and masking of all the patients and probably also the masking, and certainly the culturing of all the attendants. Sailer refers to one ward epidemic on record in which 8 cases in a ward were traced to one carrier, a nurse, who was found to have virulent meningococci in the nasopharynx.

The serum should be clear yellow or possess only the faintest tinge of red. The sediment should be slight and should settle rapidly when the fluid is shaken. At the present time polyvalent serum is the only one that can be used in untyped cases. It should be administered as early as possible, as statistics indicate the prognosis of the case is greatly improved if the serum can be given not later than the second day of the disease. As the administration of the serum, if done with reasonable skill, is harmless, it is customary now, if meningitis is suspected, to administer serum when the first spinal puncture is made and before any bacteriological studies of the serum are possible. This, of course, should always be done if the spinal fluid is turbid but even if it is clear and under moderate pressure and if there are signs of meningitis or if the case is doubtful and occurs in the course of an active epidemic, the injec-

<sup>25</sup> The Pennsylvania Medical Journal, February, 1920, vol. xxiii, p. 250



tion should be made. The amount of serum to be administered should be about 10 c.c. less than the amount of fluid withdrawn, and Sailer believes that if this rule is observed no symptoms of pressure other than perhaps a very slight transient headache will ever be produced. In the beginning of the case twice and even three times a day is not too often for the administration of the serum. After the symptoms subside the serum should be given at least once a day until the temperature becomes normal or even one or two days more.

As for the intravenous administration of the serum, Sailer says this method always combined with the intrathecal administration did not impress him with its value. In those cases in which it was used the course seemed no milder nor briefer than in those in which it was omitted, and yet he would not hesitate to use serum intravenously in all severe cases. The administration of hexamethylenamin by the mouth in large doses with the idea that it might be broken up in the spinal fluid with the liberation of formaldehyde seems to be disproved by the fact that the spinal fluid is practically never acid.

Fussell, in discussing this paper, said that if a laboratory report does not come promptly in a case of meningitis one should not hesitate to administer the serum, when the spinal fluid is cloudy. It does no harm and time is of great importance; the earlier the serum is given, the better are the results.

**Puncture of the Cisterna Magna.** It is desirable in some cases to obtain fluid from a higher region than the lumbar spine, but the difficulty in doing so has been considerable. Wegeforth, Ayer and Essick<sup>26</sup> after experimenting on the puncturing of the occipito-atlantoid ligament in animals devised a technic for doing this on man. They have found that in the living being one of the first uses to which this method commends itself is in cases of spinal subarachnoid block incident to the course of meningitis. The presence of such blocks is manifested usually by the inability of the physician to obtain spinal fluid in the lumbar region. Chartier made the puncture in the eighth thoracic space in two instances, and Ravaut and Krolunitsky inserted the needle between the sixth and seventh cervical vertebrae. Cazamian, adopting the sphenoidal route, successfully tapped the basal cisterns by inserting the needle from in front below the eye. The space between the occiput and atlas has been used for drainage of the spinal fluid by Cushing and by Haynes, but these operators resorted to the open methods of the early experimentalists. In several cases of meningitis in which lumbar puncture failed to yield fluid, Herrick found at autopsy the adhesions preventing the communication between the spinal and cranial subarachnoid spaces to be around the foramen magnum.

Wegeforth, Ayer and Essick reported a case observed by Herrick in which the advantage of the high puncture was shown. The patient had recovered under venous and subarachnoid serum therapy from an attack of meningitis but had a relapse one month later. At this time lumbar puncture failed to produce more than 5 c.c. of fluid, and as the

<sup>26</sup> American Journal of the Medical Sciences, June, 1919, p. 789.

man was rapidly becoming worse, an attempt was made to break up the adhesions around the foramen magnum by rotating the head on the spine while the patient was under an anesthetic. This failed to accomplish its purpose and repeated lumbar punctures netted but 5 to 10 c.c. at a time. The man developed stupor from which it was impossible to arouse him. His condition was so grave that an attempt at least to relieve his condition by occipito-atlantoid puncture was justifiable. Forty cubic centimeters of turbid but blood-free fluid were obtained and 25 c.c. of serum injected, following which the patient became conscious and showed marked improvement. Death occurred about twenty-four hours later, before the puncture could be repeated. In order to demonstrate the suspected block of the spinal canal, 35 c.c. of ink were injected with a syringe into the subarachnoid space through the lumbar needle. Following this a needle was inserted into the cistern and about 10 c.c. of turbid, blood-free fluid showing no traces of ink were aspirated. On exposing the spinal cord the canal was normal and on opening the dura the space beneath was entirely free of exudate. Beneath the arachnoid the ink was found to have stopped abruptly at the level of the sixth thoracic vertebra. Above the line of injection, where the pathology was not obscured by the ink, the subarachnoid space was completely filled with a very thick fibrinous exudate, which in itself would be a marked hindrance to the free passage of the fluid within the membrane. The brain was then removed and examination of the structures in the canal at the level of the occipito-atlantoid articulation showed no evidence of injury by the puncture done the day before. Herrick later performed the operation successfully on a patient having streptococcus meningitis.

It is sometimes desirable to wash the spinal cord in the living subject, but this procedure has been viewed with considerable distrust. The authors of this paper describe a case in which with the patient under light chloroform anesthesia the lumbar and cistern punctures were accomplished without difficulty and the purulent spinal fluid was allowed to flow from both needles until the subarachnoid cavity was fairly well depleted. The upper needle was connected with a reservoir containing warm Ringer's solution, which was introduced into the subarachnoid space under about 100 mm. water-pressure. The flow between the needles was very satisfactory and a great quantity of additional pus was removed by the irrigation.

This paper by Wegeforth, Ayer and Essick should contribute greatly to the injection of serum early in epidemic meningitis by the high route. The earliest lesions have frequently been found to be cortical and because of the fact that serum administered at the lumbar region frequently fails to remove the infection in the brain, it is possible that injections of serum directly into the cistern early in the disease would be of great benefit. It is conceivable also that with the cistern puncture a method might be employed of washing off the brain from an opening in the skull, and this treatment might be beneficial in cerebral meningitis.

Ayer<sup>27</sup> has recently put the cistern puncture to a practical test. The

<sup>27</sup> Archives of Neurology and Psychiatry, vol. iii, No. 1, p. 92.

patient was first seen after meningitis had been present about five weeks. Lumbar puncture yielded 6 c.c. only of clear yellow fluid which clotted entirely in a few minutes and which contained a large amount of proteid, only a few cells and no bacteria, either in film or culture. Puncture of the cisterna yielded 20 c.c. (more could have been obtained) of white purulent fluid under high pressure, containing a large number of polymorphonuclear leukocytes and gram cocci. On culture the organism was identified as *Staphylococcus aureus*. The lumbar fluid, presenting the Froin syndrome, together with the absence of organisms Ayer thinks may be considered as conclusive evidence of blockage of the spinal subarachnoid space at some point; the cistern fluid unquestionably drained infected cerebral meninges.

Two subsequent cistern punctures were performed in this case, and on the second occasion the fluid was much less cloudy, and on the third it was almost clear, with few cells and no bacteria in film or culture. In spite of this treatment the patient presented symptoms referable to internal hydrocephalus and Ayer believed puncture of the lateral ventricles would be required.

**Unilateral Argyll-Robertson Pupil.** A very interesting contribution to the Argyll-Robertson pupil has been made by Julius Bauer,<sup>28</sup> and he speaks especially of the unilateral form. That form of pupillary rigidity in which contraction does not occur from direct illumination but does occur from consensual illumination when light is thrown into the other eye, has been called by Heddaeus *Reflexaubheit*. In a narrow sense the Argyll-Robertson pupil is one which reacts neither to direct light nor consensually, and yet the pupillary reaction in convergence and accommodation is preserved. Bauer refers to a number of cases of unilateral Argyll-Robertson pupil following trauma, and in almost all much weakness of the oculomotor nerve was observed, and to the latter the Argyll-Robertson pupil was attributed, although in most of these cases the site of the lesion in the oculomotor nerve could not be determined. Bauer reports a case in which this sign was the only indication of injury of the oculomotor nerve.

A soldier developed symptoms of increased intracranial pressure, and decompression of the sheath of the optic nerve was performed. This was followed by reflex rigidity of the pupil on the side of the operation. Bauer believed the oculomotor nerve must have been injured by the operation. He speaks of the possibility of separate tracts for the pupillary reaction to light and the reaction in convergence, but he inclines to the view that the reaction in convergence is the result of a stronger stimulus than is that to light. He refers to the fact that atropin causes a loss of the pupillary reflex to light before it causes a loss of the pupillary reflex in convergence. He asserts that the great majority of writers believe that the Argyll-Robertson pupil is dependent on a lesion in the centrifugal portion of the reflex arc, viz., in the oculomotor nerve.

**Syphilis as a Cause of Herpes Zoster.** An important study on herpes has been reported by Brown and Dujardin.<sup>29</sup> In treating patients for syphilis a number developed herpes and the following questions arose:

<sup>28</sup> *Deutsche Zeitschrift f. Nervenheilkunde*, 1918, vol. lxi, p. 144.

<sup>29</sup> *Brain*, 1919, vol. xlii, part 1, p. 86.



1. Was the cerebrospinal fluid affected in any way in herpes zoster either in non-syphilitic or syphilitic subjects?

2. Was there any relation between syphilis and herpes zoster?

3. Had the administration of salvarsan anything to do with the development of herpes zoster?

These writers refer to several interesting papers published during the past few years drawing attention to the possible relationship between herpes zoster and chicken-pox and even their possible common origin. They say a large number of instances have been cited where there has been the curious incidence of chicken-pox in families after one, usually an adult member, had had herpes zoster and *vice versa*; also a few cases where the two diseases occurred in the same individual at the same time. They believe everything points to a microbic origin for herpes zoster.

As profound inflammatory changes in the posterior root ganglia, and secondary degenerative changes in the posterior roots and posterior columns of the spinal cord have been found in herpes zoster, it would not be surprising to have pathological changes in the cerebrospinal fluid, resulting from some reaction of the meninges.

The cytological estimations made by these writers were inconstant and puzzling. In the great majority of the cases there was some degree of lymphocytosis, but this varied enormously. There was no adequate explanation for the great differences, and there was no relation to the intensity of the eruption. The results could not be accounted for by the examination being made at different stages, nor did the age or general condition of the patient explain them.

No constant change was found in the amount of albumin. In the majority of the cases there was a slight increase, and in 2 cases in which there was a marked lymphocytosis the albumin registered double the normal quantity. In 1 case only was there a distinct globulin reaction.

The results of the Wassermann reaction is reported by the two authors separately. According to Brown, only two patients had had syphilis out of twelve who had herpes zoster and on whom the Wassermann test had been done; possibly a third had syphilis also. White, who had seen some 19,000 cases of syphilis, stated he could not recall having seen more than 2 cases of herpes zoster occurring during the treatment with salvarsan or neosalvarsan. Herpes zoster therefore seems to be rare during arsenical treatment.

Dujardin's findings seem to be contradictory. He speaks of the frequent incidence of herpes zoster among syphilitic subjects. Within two years about 1200 cases of syphilis in one stage or another appeared, and out of this number 9 cases of herpes zoster developed thereafter, *i. e.*, approximately 4 per 1000 per annum. Among about 13,000 other patients only 10 cases of herpes zoster were seen, *i. e.*, less than 1 per 1000.

Dujardin believes there is a predisposition to herpes zoster in syphilitic subjects. In Head and Campbell's 21 cases of herpes syphilis was certainly present in 14 and probably present in 4 more. He states that in syphilitic subjects the herpes has a predilection for the lumbar and sacral ganglia,

**The Spinal Fluid in Primary Syphilis.** Attempts have been made to foretell what syphilitic patients are likely to develop syphilitic disease of the nervous system by an examination of the cerebrospinal fluid. The results have been conflicting because the interpretation of different observers has not always been the same. McIver's<sup>30</sup> recent study is conservative. The tests he made on each specimen of spinal fluid were the Wassermann reaction, protein determination and cell count. The studies were made in a series of 91 cases. The majority of the patients were either in the primary or the secondary stage of syphilis. The lesions manifested varied from early chancre to a fading secondary rash. A few of the patients were well past the secondary stage. There was only 1 out of every 4 or 5 cases in which any previous treatment had been given, and that was usually a very small amount. All of the cases gave a 4+ Wassermann reaction of the blood serum. The cell count was made immediately on removal of the spinal fluid. The average number of cells per cubic millimeter was nine. The countries represented by the patients were numerous, so that many strains of the organism were studied.

McIver finds: 1. There is a slight increase of lymphocytes in the cerebrospinal fluid in the majority of cases of primary and secondary syphilis.

2. The increase in protein content does not appear as early as the increase in lymphocytes.

3. In his series not a single 4+ Wassermann reaction was obtained on the spinal fluid in primary and secondary syphilis.

4. In his opinion, it is not reasonable to conclude that we can determine by the examinations of the cerebrospinal fluid in cases of florid syphilis just who is going to develop symptoms of the central nervous system.

**Treatment of Syphilis.** The various forms of treatment for nervous syphilis are considered by Mehrtens and MacArthur;<sup>31</sup> they are (a) the intensive medication consisting of arsphenamin given intravenously and mercury and the iodides with such hygienic and supportive treatment as may be indicated for the individual case; (b) drainage of the spinal fluid following previous intravenous injection of arsphenamin; (c) the intradural methods of Swift and Ellis, Ogilvie and Byrnes. Mehrtens and MacArthur conducted experiments to ascertain whether the normal penetration of arsenic into the spinal fluid could be increased by an irritation of the meninges such as must occur in all of the intradural treatments.

The application of their results to treatment indicates: (1) Every case should have the benefit of intensive intravenous medication until it is certain that the case belongs among those with impermeable membranes. (2) Their experiments would suggest that for the cases resistant to ordinary therapy, in order to obtain the maximum concentration of arsenic in the spinal fluid, the patient's own blood serum should be injected into the subarachnoid space six hours before the arsphenamin

<sup>30</sup> Journal of the American Medical Association, December 6, 1919, lxxiii, p. 1765.

<sup>31</sup> Archives of Neurology and Psychiatry, October 1, 1919, vol. ii, No. 4, p. 369.

is given intravenously. The irritation of the meninges by intradural injection of the patient's own serum caused a cellular reaction ranging from 100 to 2300 cells per cubic millimeter of spinal fluid.

Simple intravenous injection of 0.6 gm. arsphenamin resulted in a positive test for arsenic in the spinal fluid in 43 per cent. of the cases.

Complete drainage of the spinal fluid did not increase the number of arsenic penetrations.

Intravenous injection of arsphenamin six hours after meningeal irritation gave 92 per cent. penetrations and compared with the controls, gave three times as strong an average concentration of arsenic.

**Landry's Paralysis Following Antityphoid Vaccination.** We occasionally meet with tetanus following vaccination against small-pox but such occurrence does not vitiate the vaccination, but encourages to greater care in technic. So when we read of some serious result following vaccination against typhoid we do not become less thankful for the wonderful results achieved in the war by the employment of antityphoid vaccination.

Guillain and Barré<sup>32</sup> are fully cognizant of the value of vaccination in the French army and they mention a rare complication they observed, a Landry's paralysis following an injection of TAB vaccine. A soldier who had been previously vaccinated against typhoid received one injection and began to feel badly the same day. He developed a rapidly ascending flaccid paralysis of the limbs, with this bulbar paralysis became associated and death resulted after ten days.

This paralysis had not been preceded by any infectious disease and the man had not been bitten by a mad dog or cat. Mention is made regarding the latter possibility as certain cases of ascending paralysis have been attributed to rabies. The paralysis began the same day that an injection of 1 c.c. of vaccine had been given, so that there seemed to be a relation between the injection and the paralysis, and the observation is added to those of the nervous system following antityphoid vaccination reported by Roussy, Souques and others.

Souques<sup>33</sup> reports 7 cases in which after the second, third or fourth antityphoid injection, but not after the first, nervous symptoms developed. It would appear to be desirable to diminish the number of injections. He emphasizes that these accidents are rare and should not prevent injections any more than accidents from an anesthetic should prevent the use of an anesthetic.

Roussy has observed hemiplegia with aphasia, probably from cerebral softening of vascular origin developing six hours after antityphoid vaccination.

Massary has observed meningeal symptoms following antityphoid injections several times, and has performed lumbar puncture with the discovery of moderate lymphocytosis.

**Spinal Hemiplegia with Paralysis of the Spinal Accessory Nerve.** In my paper of 1918 in *PROGRESSIVE MEDICINE*. I called attention to the hemiplegic form of spinal commotion or contusion with paralysis of the

<sup>32</sup> *Annales de Médecine*, 1919, vol. vi, No. 3, p. 218.

<sup>33</sup> *Revue Neurologique*, 1919, No. 6, p. 501.



spinal accessory nerve, as observed by Roussy and Lhermitte. Two more cases of this type have been observed by Roussy and Cornil.<sup>34</sup> This spinal hemiplegia with paralysis of the sternomastoid and trapezius muscles on the same side as the hemiplegia can occur from one lesion only when it is in the upper cervical cord and at the origin of the external portion of the spinal accessory nerve.

**Monoplegia Spinalis Spastica Superior.** In a number of cases of partial lesion of the upper cervical cord from bullet wound reported by Otto Sittig, there has resulted a spastic monoplegia or monoparesis of one upper limb. In some cases sensory disturbances have been found on the ulnar side of the paretic limb. This syndrome may result from different forms of spinal paralysis, from diplegia, hemiplegia or the Brown-Séquard complex, but it may be primary from the beginning. The condition differs from that in which there is hemiplegia from spinal cord lesion in which the paralysis of the upper limb is merely more pronounced than that of the lower.

The explanation awaits further investigation. Fabritius came to the conclusion that the fibers for the upper limb are separate from those for the lower limb in the crossed pyramidal tract of the spinal cord, but Hoche, Fischer and Gierlich have shown by microscopical study that small lesions of the anterior central convolution of the cerebrum cause diffuse degeneration of the crossed pyramidal tract of the cord by the Marchi stain.

The most striking case reported by Sittig<sup>35</sup> is one in which spastic monoplegia of the left upper limb existed two years after a bullet wound of the neck had been received, while the other limbs had full movement and sensation was not affected. Sittig had no pathological findings to offer in explanation, but he believes a partial transverse lesion which is probably a small area of necrosis, must exist in the upper cervical cord, and that it cannot be a lesion of the anterior horn, because of exaggeration of the reflexes in both upper and lower limbs, but especially in the upper, and because of absence of pronounced reaction of degeneration. The lesion cannot be cerebral as indicated by the course of the bullet and by the fact that in certain cases the symptoms must be of spinal origin. In 1 case the interosseous muscles of the hand were atrophied and there was slight change of the electrical reaction.

**Treatment of Spastic Contracture.** Contracture of the lower limbs in flexion from chronic disease of the spinal cord, often syphilitic in nature but not always so, is most difficult to treat. Sicard and Haguénau<sup>36</sup> recommend the daily intravenous injection over a long period of small doses of novarsenobenzol. They have found that gr. 0.15 or 0.20 given daily during two months, amounting in all to 10 or 12 gr., has never caused serious symptoms. It has caused local or general erythema or dermatitis necessitating the interruption of the treatment, but recovery always occurs after cessation of the treatment. In 7 out of 43 cases the interruption was necessary after the amount had reached 5 or 7 gr.

<sup>34</sup> *Revue Neurologique*, 1919, No. 4, p. 318.

<sup>35</sup> *Monatsschrift für Psychiatrie und Neurologie*, August, 1919, vol. xlv, No. 2.

<sup>36</sup> *Revue Neurologique*, 1919, No. 5, p. 456.

Usually 10 or 12 gr. in all given daily in divided doses during two to three months is tolerated perfectly. After 8 or 12 gr. in all have been given, or sometimes sooner, one may notice some hypotonia of the lower limbs without loss of motor power, even though the Achilles reflexes may have disappeared. There may also be diminution in the response to faradic and galvanic electricity without qualitative change. The arsenical inhibition seems to affect first the muscles in contracture, and there is not loss of the patellar reflexes. The explanation of this result is that a mild arsenical neuritis is produced without pain. This is rather an ingenious method of treatment for a condition which it has been almost impossible to overcome.

**Bastian's Law.** Further evidence that Bastian's law is not invariable is afforded by the report of a case by Roussy, D'Élsnitz and Cornil.<sup>37</sup> A soldier had a destruction of the spinal cord of 1 cm. in extent at the tenth thoracic segment, with total flaccid paralysis and anesthesia of the lower limbs. The left patellar reflex was preserved and at times there was left patellar clonus and the left Achilles reflex was normal. The reflexes of defence were pronounced.

**Multiple Sclerosis.** Recent investigations of this disease have led to important findings. Kuhn and Steiner injected the blood and cerebrospinal fluid of persons afflicted with multiple sclerosis into guinea-pigs and rabbits, and found a spirochete in the latter. Jürgens, Siemerling, Raecke attempted to transmit the disease to rabbits, and Bullock injected the spinal fluid into nerves and produced certain nervous disorders. Kuhn and Steiner employed the blood and cerebrospinal fluid from recent cases of multiple sclerosis for injection into the peritoneal cavity, into the heart, and into the interior of the eyeball. These investigators observed disturbances of motion after three days to two weeks in the majority of the injected animals, manifested especially in walking and the gait was ataxic. The disturbance lasted from a few hours to nine days, and either became less evident or changed into paralysis and terminated fatally. The material obtained from four patients gave the same results after injection, but not all injected animals reacted equally. The blood extracted from a vein of the ear or from the heart showed the presence of spirochetes of form and dimension resembling those which produce hemorrhagic jaundice. The spirochetes were not obtained in the persons who had the disease.

Siemerling later succeeded in finding the spirochetes in the brain of a person who had had multiple sclerosis. They had the same characteristics as those described by Kuhn and Steiner. Marinesco<sup>38</sup> now reports his work on this subject. He injected the cerebrospinal fluid from 2 cases of multiple sclerosis into six guinea-pigs, and obtained in the spinal fluid from the fourth ventricle spirochetes like those described by Kuhn and Steiner. Pettit and Roux believed that they were different from the spirochetes of syphilis. Thus multiple sclerosis seems to be demonstrated to be a disease of infectious origin.

<sup>37</sup> *Annales de Médecine*, 1919, vol. vi, No. 2, p. 150.

<sup>38</sup> *Revue Neurologique*, 1919, No. 6, p. 481.

**Acute Ascending Paralysis (Infective Neuronitis).** This peculiar condition was observed among troops in France and was described by Gordon Holmes and later by Bradford, Bashford and Wilson. Casamajor<sup>39</sup> has recently described it in this country. He saw 4 or 5 cases in eleven months' service with the British Expeditionary Force and 1 case in nine months' service with the American troops. The symptoms are as follows:

A short fever of from 100° to 103° F., lasting from two to four days, accompanied by severe headache and general pains, subsides and leaves the patient feeling comfortable enough to continue his duties. In the latent period that now intervenes no symptoms are to be observed for a period of four or five days to a month or six weeks. Following this latent period, the paralytic stage makes its appearance usually quite suddenly. The patient finds his legs getting weak and they rapidly become completely paralyzed. The paralysis is very flaccid and all tendon reflexes are abolished. There is now fever of 99° to 101° F. and often pain in the back. The paralysis usually progresses in an ascending fashion, the trunk musculature becomes involved, and after from twenty-four to forty-eight hours a paralysis, similar to that in the legs, is seen in the arms. The phrenic and vagus nerves may be affected and the patient dies of respiratory paralysis. If any part of the somatic musculature is spared, it is usually the distal parts of the limb.

Sensory loss is always much less marked than motor, and in early cases no sensory involvement can be determined. Later in the disease there is present a glove and stocking shaped anesthesia. The sensory signs like the motor are always bilateral.

The mortality is fairly high. In Bradford's 30 cases, death occurred in 8, half of the deaths occurring within one week of the onset of the palsy. In the non-fatal cases the paralysis remains stationery for a while, and then slow improvement occurs. Usually the face first shows improvement, and then slowly the arms and legs get stronger, and after from six to eight months the patient recovers without residual signs of the disease.

The pathological changes are diffuse, although the peripheral system is always more severely damaged than the central. The spinal cord and its membranes are affected. Edema and hemorrhage are found in the pia-arachnoid without lymphatic infiltration. The cells of the anterior horns of the cord and of the spinal ganglia show some degenerative changes. The disease has been produced in monkeys by intradural injection of a glycerin emulsion of the spinal cord of fatal human cases. The clinical features and pathological findings in these monkeys were the same as in man. Likewise the disease was similarly transmitted from monkey to monkey. Wilson has isolated an organism in pure culture that produced the disease in monkeys and which was recovered in pure culture from the inoculated monkey after death.

Foster Kennedy has called this disease Infective Neuronitis, and he reports 4 cases.

<sup>39</sup> Archives of Neurology and Psychiatry, vol. ii, No. vi, p. 605; Kennedy, *Ibid.*, p. 621.



**Causalgia.** Many cases of this paroxysmal burning pain have occurred during the recent war. The name comes from the Greek, was employed by Weir Mitchell, and literally means burning pain. The subject is presented briefly by Dean Lewis and Wesley Gatewood<sup>40</sup> with the report of 3 cases treated by injections of alcohol. The pain may be described as sticking with needles and burning or scalding and pulling. It is continuous and has periods of great exacerbation. One patient under my observation who had had it for six years slept every night with her hand in a basin of cold water, and so soon as the water became warm she would be awakened by the pain. It is not a very frequent complication of peripheral nerve lesion, as illustration of this statement Lewis and Gatewood observed only 4 cases among 550 cases of nerve injuries. Three of their patients were injected with alcohol and were said to be cured. The median nerve is involved most frequently in causalgia affecting the upper limb and the internal popliteal in causalgia involving the lower limb. When a lesion of the ulnar nerve is accompanied by intense pain, it is usually caused by an associated lesion of the median nerve or by an injury of the brachial plexus affecting both ulnar and median nerves.

Lewis and Gatewood state that the pain reaches its maximum intensity four to six months after the injury and then slowly decreases in severity, but I have just referred to a case with a duration of six years. They speak also of improvement in voluntary motion occurring slowly, but there is likely to be ankylosis. Their three patients treated by an intra-neural injection of 60 per cent. alcohol experienced almost immediate relief from pain. The ulcers and chapped bleeding areas healed rapidly, and the paralysis resulting from the injection was temporary. The early use of the muscles of the extremity affected prevented the development of contractures and atrophy.

In the first case in which the median nerve was injected, April 17, 1919, examination made September 25 revealed good power, which was practically normal in all the muscles supplied by the median nerve. In the second case, the internal popliteal nerve was injected, April 24, 1919, and August 10, 1919, an examination revealed that all the muscles supplied by this nerve had recovered motion and that the power of the gastrocnemius, soleus and tibialis posticus was practically normal. In the third case the injection was made, September 6; and September 17, motion was present in the opponens pollicis and in the flexors of the middle finger. Motion was beginning to return in the part of the flexor profundus attached to the index finger, but there was no return of power in the flexor longus pollicis.

Sixty per cent. alcohol seems in some cases to interrupt the conduction of sensory impulses, but not to interfere with the transmission of motor impulses. When the injection is made the nerves should be exposed. The injection should be given above the wound or site of the injury, and from 1 to 2 c.c. of 60 per cent. alcohol should be injected. As this is injected the nerve swells and becomes white, resembling in color a nerve that has been fixed in alcohol for histologic study.

<sup>40</sup> Journal of the American Medical Association, January 3, 1920, p. 1.

Sicard and Dambrin<sup>41</sup> have treated 47 cases of causalgia during the war by alcoholic injections, and they report the late results in 32 cases. Twenty-seven cures were effected after a period in some instances of over four years. Of these 13 were in the median, 9 in the sciatic, 3 in the ulnar, and 2 in both median and ulnar. Improvement was not obtained in 5 cases, although later some improvement seems to have occurred in three of these. These writers assert that in typical causalgia alcohol injections cure permanently so that there is no recurrence of the pain as is the case after injections for trifacial neuralgia. The injections have never caused permanent paralysis and should be made directly into the exposed nerves in 70 per cent. strength under local or general anesthesia.

**Volkman's Contracture.** It has been supposed that ischemic contracture does not occur in the lower limb but Souques<sup>42</sup> shows by the report of a case that this opinion is untenable and he argues that it is unreasonable to limit it to the upper limb, even if cases of involvement of the lower limb are rare.

**Paresthesia Precox after Nerve Suture.** Sometimes paresthesia occurs in the nerve distribution so soon after the suture of the nerve that regeneration is impossible and an explanation for return of sensation has been difficult, especially when the return of paresthesia occurs within two to eight days after the suture. Tinel<sup>43</sup> describes the condition as tingling or even pain, and examination reveals some restoration of objective sensation, but it is far from normal. Touch, pricking, rubbing, pinching are all recognized but vaguely, often disagreeably, and sometimes painfully. This early sensation is rare after suture and much more frequent after nerve grafting. It cannot be caused by early regeneration, as such rapid regeneration is impossible, and yet this has been the explanation offered by some. The sensation is not like that which follows regeneration, it does not improve progressively, does not become complete; but on the contrary it is impaired after some weeks or months, and may have disappeared before the true paresthesia of regeneration begins. The precocious paresthesia is not the manifestation of function of nerves in territory adjoining that of the sutured nerve, for this action is of slow development.

Tinel believes the phenomenon is of sympathetic nature, latent under normal circumstances and dependent on the perivascular sympathetic nerves. This sensation usually latent becomes increased temporarily from the reflex irritation of the central end of the sutured or grafted nerve. It is not confined to the limits of the sutured nerve.

**Prognosis of Nerve Injuries.** Injuries of nerves have been well studied during the recent war and much has been learned. Robert Kennedy<sup>44</sup> is an authority on this subject. He considers sepsis one of the most unfavorable factors in regeneration, but he does not believe, as some have believed, that it is a complete bar to recovery, as some cases in which very marked sepsis has been present have given good results.

<sup>41</sup> *Revue Neurologique*, 1919, No. 6, p. 517.

<sup>42</sup> *Ibid.*, No. 5, 451.

<sup>43</sup> *Ibid.*, No. 6, p. 521.

<sup>44</sup> *The Lancet*, July 5, 1919, p. 5.

It is, however, always an unfavorable factor, as it is likely to lead to the formation of cicatricial tissue and permanent damage of the nerve trunk.

Usually compression of a nerve is regarded as more favorable than severance, yet many cases of the latter give results apparently as good as, and in some cases better than, the former. Sometimes it does not require much contraction to destroy the function of the nerve, the most notable examples being in the case of the ulnar sulcus and in the aqueduct of Fallopius.

A clean cut severing a trunk as a rule gives a better prognosis than when the severance is made as part of a lacerated wound, and in general, up to a certain size the larger the nerve trunk the more likely is a good result.

Where the brachial plexus has had its roots pulled out from the cord Kennedy states that the upper limb may be amputated at the shoulder, as it would only be an annoyance to the patient.

The muscular atrophy is important in prognosis, as recovery of motion will not occur until the muscle is again largely built up and restored to a condition in which the electrical reactions are normal. Recovery of faradic irritability in the affected muscles is, as a rule, the immediate precursor of recovery of voluntary contractions in the muscle.

As to the time for secondary suture if primary suture has failed, no longer than four months, everything being favorable for further operation, should be allowed to elapse after the primary suture without resorting to secondary operation, unless some definite indication has developed to prove that the nerve is reuniting. Where there is an open wound, the wound must first be induced to heal. Should the parts be healed sufficiently long and only the question of time be considered, the period between two and three months after the nerve section appears to give a prognosis of the earliest possible recovery. This seems to be a shorter period than some surgeons recommend. Kennedy has found that cases in which operation has been done within three months gave a commencing recovery in three and a half to four months, but if five or six months elapsed before operation then seven or eight months elapsed before any improvement in the muscles occurred. When many months have elapsed before operation the date of recovery of muscles is so remote and so gradual that it is very difficult to say exactly when it has commenced, but complete recovery is possible, and this is true even when the periods have been long. Kennedy refers to a case in which recovery occurred where operation had been delayed fourteen years.

Muscles which have just recovered their function are incapable of doing much work, and any attempt by the patient to make them work will result in fatigue which will hinder further recovery. The paralysis then recurs and remains until the muscle from the enforced rest again becomes functional. Active movements should be strictly limited until the muscles are sufficiently strong.

**Hypertrophic, Progressive, Non-familial Neuritis of the Adult.** Dejerine and Sottas<sup>45</sup> described the interstitial, hypertrophic, progressive neuritis

<sup>45</sup> *Annales de Médecine*, 1919, vol. vi, No. 4, p. 296.



of childhood in 1893. In brief, the symptom-complex was that of advanced tabes with generalized muscular atrophy, kyphoscoliosis and hypertrophy of nerves.

Marie in 1906 reported an observation in which the symptoms differed greatly from those described by Dejerine and Sottas. In Marie's case there were the family character, muscular atrophy, hypertrophy of the peripheral nerves, sensory disturbances, loss of patellar reflexes, scoliosis and deformity of the feet, as in the earlier type; but Marie's type presented exophthalmos, intention tremor and scanning speech as in multiple sclerosis. It did not have Romberg's sign, ataxia, fulgurant pains and nystagmus. Marie and Boveri proposed to change the name to familial hypertrophic neuritis.

Now Roussy and Cornil describe a type differing from the two types described above. The disease was not of familial character and began about the fortieth year. The atrophy was more pronounced in the upper limbs and in the distal parts of these limbs, and was with fibrillary tremor and reaction of degeneration. Ataxia was present in the upper as well as in the lower limbs. Romberg sign and intention tremor of the upper limbs were observed. The tendon reflexes of the lower limbs were lost or feeble. The nerves of the limbs were hypertrophied. The type differed from that of Dejerine in the late onset, the presence of intention tremor and the absence of Argyll-Robertson pupils, myosis, nystagmus and generalized atrophy. It differed from Marie's type in the absence of familial character, scanning speech, and exophthalmos, and in the predominance of the muscular atrophy in the distal part of the upper limbs. They propose to call their type hypertrophic, progressive, non-familial neuritis of the adult.

**Syphilitic Multiple Neuritis.** The occurrence of multiple neuritis from syphilis has been under dispute a long time. Some writers have confused with multiple neuritis paralysis of a single nerve from pressure, as from a gumma, and there has been much doubt as to whether it is not the mercury or the arsenic instead of the syphilis which causes the multiple neuritis. Petrén<sup>46</sup> is probably the most recent writer to consider the existence of the syphilitic multiple neuritis. He holds as do others that syphilis may last thirty years or more, and that the only proof of a recovery from the disease is a reinfection with syphilis. He has studied a case of multiple neuritis occurring in a syphilitic person in whom stomatitis, nephritis, tremor like that of mercury, progressive cachexia terminating in death, and mercury in the urine, establish in his opinion mercury as the cause of the multiple neuritis.

He has collected from the literature 13 cases in which multiple neuritis developed more than a year after the syphilis was contracted, to these he adds 3 more doubtful cases, and he submits these to critical study. He has also collected 14 cases in which the duration of the syphilis before the onset of multiple neuritis had been less than a year, and to these he adds 5 other cases. His conclusions from this study are interesting, they are:

<sup>46</sup> *Lunds Universitets Arsskrift*, vol. xiv, No. 9.

1. Syphilis may cause multiple neuritis during the first year after infection, but such occurrence is very rare, and there are only 11 cases which may be accepted as instances of this type.

2. It has not been demonstrated that syphilis of a duration of more than a year causes multiple neuritis.

3. Acute mercurial intoxication may be the cause of multiple neuritis, and probably chronic mercurial intoxication may also be a cause.

**Innervation of Soft Palate.** There must be separate nuclear representations of the motor supply of the soft palate and larynx, and in a case I<sup>47</sup> reported the soft palate was paralyzed while the vocal cords were intact. The case was one of paralysis of the glossopharyngeal and pneumogastric nerves, not occurring from trauma.

**Diphtheritic Ataxia.** Dejerine pointed out that in grave anemia affecting the spinal cord the symptoms are those resulting from involvement of the crossed pyramidal tracts, viz., spasticity, weakness, exaggerated reflexes and Babinski sign; and those resulting from involvements of the median portion of the posterior columns, viz., ataxia, loss of sense of position and passive movement, and of vibration, and preservation of heat and cold sensations. This forms a symptom-complex strongly suggestive of anemic changes of the cord, but George Wilson<sup>48</sup> points out that it may result from diphtheria, and he reports three clinical cases. As he had no necropsies he can only assume that the lesion is in the posterior columns of the spinal cord. In the diphtheritic cases the lateral column symptoms are wanting.

I am inclined to think that the lesion may be a neuritis confined to the deep branches of the nerves supplying the muscles and bones, whereas the superficial nerves escape. We have examples of the selective action of toxins for certain nerves, and it does not seem forced to assume that the diphtheritic toxin selects definite nerves, indeed we know it has this peculiarity.

**Congenital Facial Palsy.** Cases of this type are fairly frequently reported in the literature although they cannot be considered common Fry and Kasak<sup>49</sup> report a case, a girl aged eleven years, in whom there was complete absence of mobility in the distribution of the seventh nerve on each side of the face. There was also an absence of all lateral movements of the eyeballs, mandible and tongue, and a teratologic absence of the left breast.

**Family Form of Optic Atrophy.** Family form of optic atrophy, or optic atrophy of Leber, has usually been considered as a family disease of the optic nerves having no relation to other family diseases of the central nervous system. It has been shown that this conception is not correct, and recently this subject has been discussed by Imamura and Ichikawa.<sup>50</sup> They report impairment of vision beginning suddenly in a brother and sister at the ages of eighteen and twenty-four years respectively. Each had central scotoma and the condition was regarded as Leber's atrophy, but the sister had tremor and intellectual defect.

<sup>47</sup> *Journal of Nervous and Mental Disease*, June, 1919, p. 481.

<sup>48</sup> *Archives of Neurology and Psychiatry*, vol. ii, No. 2, p. 201.

<sup>49</sup> *Ibid.*, vol. ii, No. 6, December, 1919, p. 638.

<sup>50</sup> *Revue Neurologique*, 1919, No. 4, p. 277.

Behr found symptoms of nervous disease in six defective children who had Leber's atrophy, all of whom were boys. These symptoms indicated implication of the pyramidal tracts and cerebellum. These children had hypertonia of the limbs, exaggeration of reflexes without notable paresis, slight ataxia, some nystagmus and weakness of the bladder. Behr described this complex as infantile familial optic atrophy complicated, in distinction to Leber's atrophy which he designated as juvenile familial optic atrophy uncomplicated. Takashima reported also 6 cases similar to those of Behr. All these cases were in children while in the brother and sister reported by Imamura and Ichikawa the symptoms began after puberty.

Thus it is shown that Leber's atrophy like many other familial nervous diseases shows transitional forms to other types of nervous disease.

**Ménière's Disease.** In two cases of this disorder occipital decompression by Aboulker<sup>51</sup> has been followed by much relief.

**Reduction of Dislocated Cervical Vertebra.** It is not often that a vertebra becomes dislocated and is replaced by manipulation. J. Philip Buckley<sup>52</sup> considers this occurrence of sufficient importance to justify him in reporting a case. An officer showed by an x-ray photograph a dislocation between the fourth and fifth cervical vertebrae. Reduction was effected under anesthesia. Although the dislocation seems to have been considerable and to have caused a marked deformity of the cervical spine, so that the head was held forward with the chin approximated to the chest, the man had been walking about with the diagnosis of injury to the shoulder.

**Cervical Ribs.** A very interesting paper reviewing most of the information obtainable on cervical rib has been written by Church.<sup>53</sup> He has found that clinical manifestations rarely develop under the age of ten, commonly make their appearance between ten and thirty, and occasionally give rise to symptoms which first appear only in the later decades of life.

**Progressive Lipodystrophy.** Under this term is understood a condition characterized by progressive and complete disappearance of the fat from the subcutaneous tissue of the upper part of the body, and marked increase of the subcutaneous fat in the body below the iliac crest. The credit for the publication of the first case is given by Boissonnas to Barraquer, but Simons seems to have been the first to have recognized and clearly described the condition. Females at first were thought to be alone affected but it has been seen in males.

Boissonnas<sup>54</sup> has an interesting paper on this disorder. The disease appears between the ages of five and forty-two years, sometimes without apparent cause, sometimes after an infectious disease or after the beginning of menstruation. The emaciation of the face is very striking and early, and the atrophy of the fat extends progressively and slowly to the neck, chest, shoulders, arms and abdomen.

<sup>51</sup> *Revue Neurologique*, 1919, No. 6, p. 493.

<sup>52</sup> *The Lancet*, January 17, 1920, p. 149.

<sup>53</sup> *Journal of the American Medical Association*, July 5, 1919, p. 1.

<sup>54</sup> *Revue Neurologique*, October, 1919, No. 10, p. 721.



In some cases there have been excessive sweating and malodorous sebaceous secretion. No necropsies have been obtained, so that nothing is known regarding the adipose tissue of the internal organs.

The fatty hypertrophy of the lower limbs is not usually observed before the emaciation of the face, but it may occur simultaneously with it. It implicates the gluteal and gluteocrural regions and may not extend further, but usually it does extend to the thighs and legs, and affects the two sides symmetrically as a rule, but one limb may be more hypertrophied than the other.

The muscular system remains intact, and electrical reactions of the muscles and nerves have always been normal. The osseous system also is intact as shown by the x-rays, even the sella turcica is normal. Sensation is not affected but cold may be more readily felt in the parts deprived of fat. Mentality is normal. The nerves have been normal in all the cases, but some exaggeration of tendon reflexes has been observed. The general health is good. There is no pain.

There have been 6 reported cases in which the fat atrophy of the upper half of the body has not been associated with fat hypertrophy of the lower half, and all were in males. These cases Boissonnas thinks should be kept distinct from those of the other type. He gives an excellent review of the literature, and reports 2 cases, 1 of which seems to have been reported previously.

The etiology of this disorder is very obscure. It has been attributed to the endocrine glands, as one might expect, but it is difficult to understand why the fat disappears in one part of the body and accumulates in another part. Obesity is not found as the only sign of disorder of the endocrine glands. Boissonnas attributes the progressive lipodystrophy to a lesion of the nervous system, but where this lesion is to be placed is uncertain. Nothing is offered as to treatment.

**The Nervous System in Purpura Hemorrhagica.** We have not much evidence of disease of the central nervous system in this disease, but Gordon<sup>55</sup> in one case has found the brain and spinal cord extremely pale and nowhere could be seen a single vessel showing the presence of blood in it. The circle of Willis merely presented a series of white bands which were flattened because of absence of blood in the vessels. In microscopical study the lesions were confined to the gray matter, and consisted chiefly of vacuoles situated between the cells, thus destroying the cells in the vicinity. The interpretation offered is that multiple hemorrhages occurred simultaneously in many segments of the nervous axis. The vacuolated spaces were supposed to indicate complete absorption and disappearance of the cells destroyed by the hemorrhages.

**Hereditary and Familial Exophthalmic Goiter.** Exophthalmic goiter occurring in several members of a family seems to be very rare, and Souques and Lermoyez<sup>56</sup> in reporting their cases found but little in the literature on this subject. They observed 4 cases in the same family, and three other members of this family were said to have the disorder. There were thus 7 cases in sixteen adults of three generations. Usually

<sup>55</sup> *Journal of Nervous and Mental Diseases*, August, 1919, p. 144.

<sup>56</sup> *Revue Neurologique*, 1919, No. 1, p. 20.

similar heredity is transmitted by the females, but in the cases reported by Souques and Lermoyez of hereditary and familial exophthalmic goiter the heredity was transmitted by the males. They believe there was a hereditary predisposition, a susceptibility of the thyroid to infections and intoxications in this family.

The paper by Climenko<sup>57</sup> is interesting in this connection. He reports 2 cases occurring in children, brother and sister. The boy, aged ten, had a pulse of 156; blood-pressure systolic, 125; diastolic, 85; marked exophthalmus, a marked Möbius sign, and fine tremor of the hands. The girl, aged six, had a very large thyroid, von Graefe's sign, and a pulse of 100.

The mother of these two children had the typical symptoms of Graves's disease, and the maternal grandmother of the children had palpitation and an enlarged thyroid. Two sisters of the mother had goiter, and one of these had other symptoms of Graves's disease.

The disease first showed itself in the third generation of this family about the age of twenty-seven, but two young children were affected in the fourth generation. No sign of syphilis could be detected and the Wassermann tests were negative. The transmission was a direct one and along the female line. As Climenko says, the occurrence of symptoms of Graves's disease in a boy, aged ten, and in a girl, aged six, is in itself an extremely rare condition.

**Hysteria.** It has seemed to me that some of the conclusions drawn from a study of war hysteria as seen in soldiers are not applicable to the hysteria of civil life, and this is true of the excellent presentation of the subject by Rosanoff.<sup>58</sup> Disorders were seen in war service in wholesale form, whereas in times of peace the same or similar conditions are far less numerous. We shall have no difficulty in accepting Rosanoff's statement that hysteria is purely functional in its nature and that the mechanisms underlying hysterical symptoms are purely mental. Whatever is organic is not hysterical, but, of course, the organic is often associated with the hysterical.

Rosanoff states it is important to distinguish the acute emotional disorders observed at the front from hysteria. This distinction has been most clearly drawn by Lévi, according to whom it is a mistake to think that hysterical manifestations are an integral and necessary part of the emotional syndrome. They can appear independently of all emotion; and the emotional syndrome has nothing in common with hysteria. It seems, according to Rosanoff, that the psychic factors to which war neuroses in general are attributed, fright caused by danger from projectiles, horrifying sights, etc., play a part only in the acute emotional syndrome; hysterical phenomena are not directly produced by them. On this point there is unanimous agreement among those who have had opportunities of observing cases at the front. I think one may question whether this statement applies equally to the hysteria of civil life. How is a paralysis of a limb following immediately on a severe fright to be explained?

<sup>57</sup> Archives of Neurology and Psychiatry, 1920, vol. iii, No. 5, p. 530.

<sup>58</sup> Ibid., October, 1919, vol. ii, No. 4, p. 419.

Rosanoff regards as the mainspring of hysterical conduct, a concealed, illicit, morally untenable motive. The motive is not always the same. Its most frequent variations are:

1. To evade the law of conscription.
2. To procure, on reporting for physical examination at a training camp, rejection for physical unfitness.
3. To evade dangerous, disagreeable or difficult duty, or to evade all duty.
4. To procure the ease and privileges of hospital care.
5. To procure discharge on certificate of disability.
6. To procure compensation for disability.

These statements do not apply strictly to civil life, but a quotation from Salmon is given to the effect that the psychological basis of the war neuroses (like that of the neurosis in civil life) is an elaboration, with endless variations, of one central theme; escape from an intolerable situation in real life to one made tolerable by the neurosis. The justification for this point of view may not always be easily found in civil life.

Rosanoff's views on malingering are very interesting. There is close similarity in the clinical manifestations of malingering and hysteria. A point of differentiation is the conscious or unconscious quality of the motivation, but this is very unreliable, for some hold that malingering also may be subconscious or unconscious. One may begin by shamming and as a result of autosuggestion end by developing the condition simulated. Rosanoff believes the conclusion, that one may well hesitate to apply to civil life, viz., that what some have described under the name of hysteria and what others have described under the name of malingering are one and the same thing.

He does not accept Freud's view that all hysteria has a sexual basis; in his opinion, war experience has shown even to loyal adherents of Freud, that hysterical manifestations can be actuated by motives other than sexual. Even in peace times neurologists have seen hysterical manifestations arise on the basis of exaggerated claims for indemnity, sick benefit, accident insurance, workmen's compensation, etc., without the intervention of sex motives.

When we read that the material observed in the Plattsburg Hospital, on which Rosanoff's paper is based, represents, by selection, the most refractory cases of hysteria met with in the army, we can understand that some of the conclusions do not apply to hysteria of peace times. Of 100 so-called concussion and nervous cases received at stations near the front, sixty-five were returned to duty within a few days and thirty-five were sent to army neurological hospitals. Of the latter, twenty were later also returned to duty and fifteen sent to Base Hospital No. 117, at La Fauche. Eventually fourteen of even this group were returned to duty and but one sent back to the United States. Rosanoff's paper, however, is exceedingly interesting and bears clearly the stamp of original observation and original thought, and therefore it is a valuable contribution to the study of hysteria.



**Hysterical Anesthesia.** A sign which is believed by Williamson<sup>59</sup> to be of value in determining whether an anesthesia is functional or organic consists in testing the sensation by the tuning-fork. If the anesthesia is limited to a portion of a limb, or one portion of the body, and if a long bone such as the tibia, ulna, femur, or sternum is situated partly in the anesthetic area, and partly in the non-anesthetic area, the test may be made. If the vibrating sensation is not felt anywhere when the foot of a large vibrating tuning-fork is placed on a subcutaneous part of the bone, just within the area of anesthesia, but the vibrations are felt when the foot of the vibrating tuning-fork is placed on the subcutaneous part of the bone just outside the area of cutaneous anesthesia, then the case is one of functional anesthesia.

In the normal condition, when the foot of a large and suitable vibrating tuning-fork is placed on the subcutaneous surface of one end or one part of a bone, the vibrations are transmitted all over the bone, and are felt, though with diminished intensity, at distant parts. Hence, if the foot of the vibrating tuning-fork is placed on the bone just within the limit of the anesthesia, though the vibrating sensation may not be felt at that point, the vibrations will be transmitted to other parts of the bone, and should be felt there if the vibrating sensation of the other part or parts is not lost. If therefore the vibrating tuning-fork is felt just outside the limit of the anesthesia area, this indicates that the vibrating sensation is not lost in the bone at this point, and the vibrations should be felt there when the foot of the vibrating tuning-fork is placed within the anesthetic area.

**Neuroses of War.** There has been much written on the effects of high explosives in the war, the condition at first called shell shock. Mott described in 2 cases multiple punctate hemorrhage in the brain, and the view that the condition was caused by more or less gross structural damage of the central nervous system was widely held for a time. Experience gained later showed that this view in its entirety and for the majority of patients was untenable and was rejected in favor of emotional factors as the sole cause of all neuroses, both those of peace and war. Alfred Carver and A. Dinsley<sup>60</sup> acknowledge the important influence of the emotions in such conditions, but they think one meets with a large number of patients suffering from the neuroses of war in which the emotional factor does not appear to be primary, and cannot be considered as causative. In such patients a purely psychogenic explanation will not suffice. Observation of this group reveals that physical or commotional factors have been operative, and they have carried out experiments on animals to prove their contention.

They believe that emotion and commotion may operate together and that this is the most common occurrence, as may be determined by a careful study of the histories obtained in the Special Military Neurological Hospitals. The neuroses of war may be brought about therefore:

(a) By the action of purely emotional shock, which at the present time is well recognized, but whose importance tends to be overestimated.

<sup>59</sup> Review of Neurology and Psychiatry, 1918, vol. xvi, Nos. 11 and 12, p. 380.

<sup>60</sup> Brain, vol. xlii, part 2, p. 113.

(b) By the action of purely physical shock.

(c) By a combination of the two above mentioned etiological factors; and this is the more common.

**Status Lymphaticus: Its Occurrence and Significance in War Neuroses.** Davis<sup>61</sup> examined soldiers to determine what was the effect of status lymphaticus in the etiology of the neuroses, and as characteristic of this syndrome he depended on bodily hypotrichosis in contrast to abundance of hair on the scalp, feminine type of pubic hair, velvety skin, a tendency toward abnormal length and narrowness of the thorax, and slenderness in the long bones. He found that the incidence of so-called status lymphaticus in soldiers with psychoneurosis is virtually twice that in wounded soldiers who did not develop a neurosis. This finding appears to indicate that in the etiology of the war neurosis an endocrinal abnormality increases susceptibility to the neuroses. It emphasizes the fact that in many, if not in all cases, strong etiological factors are at work in the physiologic domain without minimizing the importance of factors that are psychical. It brings new proof in his opinion of a physical character, of the conception that, in the war neurosis, an initial weakness operative in the psychical field, is essential.

**Epilepsia Spastica.** This new form of epilepsy described by Albert Knapp<sup>62</sup> is one in which the symptoms suggest pseudo-bulbar palsy or paralysis agitans. It develops at the period of puberty or early adult age. The gait becomes spastic and sometimes ataxic, the patellar and Achilles reflexes are exaggerated even to clonus with Babinski's sign, the speech is slow and indistinct, there are difficulty of swallowing and of the movement of the tongue, rigidity of facial expression, general rigor of muscles, slowness of all movement, and the position of the body characteristic of paralysis agitans.

Knapp reports a case of this type in detail. A boy at the age of seven years fell and struck upon his head, and epileptiform convulsions developed at the age of ten years. They were associated with vertigo and became very numerous, as many as eighteen attacks in a night. Later the attacks occurred also in the daytime. The boy's character changed and he became irritable, refractory, and showed great mental failure. His gait became staggering, and spastic, and later he was confined to his bed. All the muscles became rigid. He was given very large doses of bromide and marked improvement in his entire condition developed, so that his speech, gait and mentality improved. The clinical picture suggested paralysis agitans, multiple sclerosis, Wilson's progressive degeneration of the lenticular nucleus, or pseudobulbar paralysis, but the extraordinary improvement under bromide does not occur in these disorders.

Knapp believes he has described a special form of epilepsy which has its lesions in the basal ganglia of the cerebrum. It is one more of many symptom-complexes attributed to these structures.

<sup>61</sup> Archives of Neurology and Psychiatry, October 1, 1919, vol. ii, No. 4, p. 414.

<sup>62</sup> Monatsschrift für Psychiatrie und Neurologie, vol. xlv, No. 1.

**Luminal in the Treatment of Epilepsy.** This drug has been employed by Dercum<sup>63</sup> with most gratifying results. At first he gave it in divided doses three times daily, but it sometimes made the patient a little heavy during the day and at times even a little dizzy. When he limited the administration to one dose at bedtime these symptoms did not appear, while the efficiency of the drug was in no wise impaired. The drug exercised a remarkable control over the seizures and the dose required was exceedingly small. A grain and one-half of luminal or two grains of luminal sodium given at bedtime were ordinarily sufficient. In a number of instances the use of luminal has resulted in the abolition of the convulsive seizures for periods extending over many months or even several years. At no time was the slightest deleterious effect noted, and no drug craving is produced. Sometimes it is well to begin the treatment with small doses of bromide, and the general care of the patient as is common in epilepsy should not be omitted.

<sup>63</sup> Therapeutic Gazette, September 15, 1919.



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